A Database Publication

THE MICRO USER

Volume 7
Number 10
December 1989
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to the BBC Micro, Maste
Archimedes series and A300

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Swift search routine for the Arch

HELPER
Use sideways ram as a micro notebook

JINGLES
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SPINNER
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Stroke by stroke tour of golfing paradise

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- The Micro Bugs
- Power control
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...plus all the latest games

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James Bond is out on his own and out for revenge

UNWRAPPED!
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Full preview of COMPUTER SHOPPER SHOW '89

THE M·I·N·E·R·V·A COLLECTION

Archimedes Games

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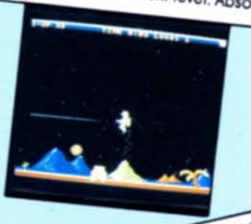


THUNDERMONK

An intriguing new game with a variety of ways to achieve the ultimate goal of recapturing the Lonesome Monk's Monastery from the grip of the Evil Demons. Lead The Lonesome Monk's army through the labyrinths of the Monastery and recapture all the great treasures hidden in the building. Keep your eyes peeled for the secret passages. You too could walk through walls!

FREDDY'S FOLLY

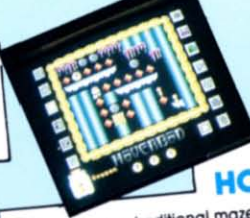
An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

ORION

Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants –otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

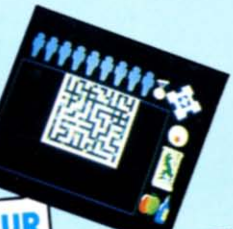
MISSILE CONTROL

Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.



HOVERBOD

Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware . . . the Ibbles and Squibbles start to materialise!!!!



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MINOTAUR

The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.

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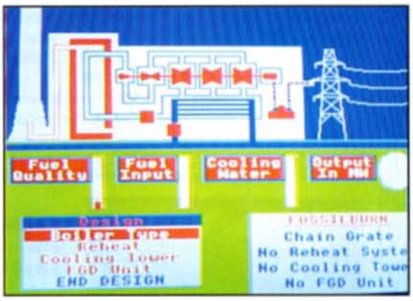

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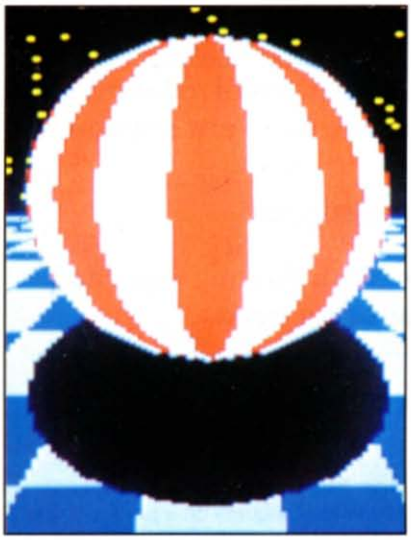

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GAMES

Leisure software that's written specifically for the Archimedes starts to outnumber the 8 bit conversions. We take a look at two of the latest releases – E-Type and Interdictor.
– See Page 33.

COMPUTER SHOPPER SHOW '89

NOVEMBER 24 - 26, ALEXANDRA PALACE

From hardware to software, this is the event where you can do all your micro shopping – and save money. For a full preview of what you'll find there, whether it's for a BBC Micro or the Archimedes series, read our preview starting on Page 16

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 124** to find just what you're looking for – from cheap modems to complete computer systems.

✓ **For full details of how to use the Checksums, see the article on Page 48 of the February 1989 issue of *The Micro User*.**

✱ **The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.**

Next month in THE MICRO USER

AFTER CHRISTMAS
Santa seeks revenge

DATABASE
Check your health

COMPATIBILITY
File converter

EDUCATION
Using a turtle

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NEWS beat

Archimedes becomes host for transputers

AN increasing number of people are looking towards Archimedes machines as a host for transputer systems in place of the more traditional PC. Advantages are speed, price, graphics capabilities and software availability.

This rethink in the transputer environment has been taken up by Gnome Computers (0223 461520) which has launched a range of transputer add-in boards for the Archimedes workstation supported by software packages for transputer program development.

The environment is based around three expansion boards. The Link Adaptor board allows the workstation to communicate with external transputer systems using the Inmos standard link protocol at clock rates of 10 or 20 MHz.

The Tram Motherboard uses the same link adaptor circuitry and also houses up to four transputer modules and the Transputer Baseboard contains a T425 or T800 transputer, up to 8Mb of memory and a link interface to the workstations. Up to four expansion boards can be fitted in each workstation.

Software development tools include the Inmos Transputer Development System and Transputer Development Toolkit for developing occam programs. More conventional languages are supported by the 3L compilers for parallel versions of C, Fortran and Pascal.

With a T800 transputer and 2Mb of memory the Transputer Baseboard costs £1,144. The Tram Motherboard costs £287 and the Link Adaptor Board £230.

Gnome has also announced two upgrade products for Archimedes and R140 micros.

Its ARM3 upgrade board allows the existing ARM2 processor chip to be replaced by the new ARM3 chip with cache memory and Gnome's 4-8 Mb upgrade board allows Archimedes 440 and R140 machines to be upgraded to 8Mb.

The ARM3 will cost £569 and the memory upgrade £1,092.

A helping hand for adventurers

SO many people are now into playing adventure games that a thriving helpline business in Manchester is taking up to 600 calls a week.

The Guiding Light was started recently by Jackie Wright who previously ran a helpline service from her home. It now has its own offices with ten lines and four members of staff.

A self confessed games fan, Jackie has completed many adventures herself but when an obscure query comes up she turns to manufacturers for the answer.

Members of the public who enter The Guiding Light's monthly hints and tips competition also help.

The secret of a good games line is to give just enough advice to get the player out of a spot but not so much that the rest of the game is spoiled.

A nucleus of popular games give rise to most calls.

At present, Jack The Ripper, Dracula, Frankenstein, Personal Nightmare and the Police, Space and Kings Quest games are top of the list.

"We find that certain places in each game always cause the problems", said Jackie. "If someone rings and mentions a game, we almost know before they tell us where it is they have got stuck.

"If we receive a call on Personal Nightmare they nearly always want to know where to get the free voucher to send off for the film, and there are similar blackspots in many other adventures".

For games adventurers who are being driven mad by a sticky spot, The Guiding Light can be contacted on 0898 338933 which costs 38p per minute.

Developers united

THE often unsung heroes of the software market are the developers who keep it going by producing the goods.

They are the starting point of an industry worth millions and now a body has been set up to look after their interests.

The Society of Software Authors is an organisation for programmers, graphic artists, musicians and game designers which so far has 400 members, including such big names as Jez San and Dave Pringle.

Started by Jon Dean and Mev Dinc it is designed for the sharing of knowledge and protection of interests of its member but is not a trade union or militant body.

Its aim is to ensure that the relationship between publishers and authors is fair and professional and that authors' interests are protected.

It offers practical advice on such matters as tax, copyright and contracts.

The SSA produces fact sheets and runs a helpline (0867 35485).

Disc aids children

AS we get to Children In Need time of year again, Panda Discs has joined the fun-raising bandwaggon with a new music disc. It contains more than a dozen pieces for the Hybrid Music 5000 system including the theme music for the BBC's Software Show and a song specially composed for Children In Need by Phil Comber.

Music on the disc has all been donated by Panda Disc programmers whose royalties will be added to the proceeds of disc sales and all donated to Children In Need.

The disc costs £5 including postage and packing from Panda Discs, Four Seasons, Tinkers Lane, Brewood, Stafford, ST19 9DE.

Xperts get together

CAMBRIDGE is emerging as a centre of expertise for the X Windows system and leading computer companies in that area have now formed a group to investigate how they can work together.

They include Acorn, Torch Technology, Unipalm, IXI, Gems of Cambridge, Tenset Technologies and Cambridge Micro Computers.

Known as Control-X, the group intend to hold monthly meetings. As well as providing a forum for the exchange of ideas, its members will be

Turn to Page 9 ➤

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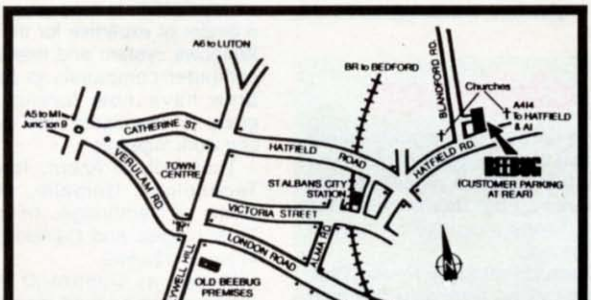
Events & visiting companies subject to change without notice.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OLD BEEBUG
PREMISES
N
A6 (1081) to A1
M25 Junction 22
To M1 Junction 6
M25 Junction 21A
BR to KINGS CROSS

Companies represented include:

Acorn Computers
A number of Acorn staff will be on hand to demonstrate and discuss the complete range of computers including the A3000.

Colton Software
Pipedream 3, one of the most powerful packages available for the Archimedes will be on demonstration along with View Professional for the BBC B and Master 128.

Computer Concepts
The new 'Impression' package will be in action along with the Scan-Light and Scan-Light Junior scanners.

Minerva
Minerva will be demonstrating their extensive range of quality software for the Archimedes including their new 'MultiStore' database.

Computerware
Discuss your hard disc requirements with the experts. Drives ranging from 20 Mb to a massive 75 Mb are available for both the 300 and 400 series.

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From Page 7

working closely together on X-related technology, promoting the X Windows system and helping to establish a UK X-users group. The X Windows system from the Massachusetts Institute of Technology is a defacto standard for controlling graphics and window software over a heterogeneous network of computers and is the foundation layer for graphical user interfaces.

More information on the group can be obtained from David Slight at Acorn (0223 245200) or John Stewert at Unipalm (0954 211797).

Computers are good for you

A RECENT study at Nottingham University has scotched the hypothesis that computer addicts suffer stunted psychological and social development.

Research has shown that computer dependency can actually be therapuetic for those who tend to find it hard to relate to other people.

The findings have been published in a book Computer Addiction? written by Dr Margaret Shotton of the university's Department of Production Engineering and Prodution Management (0602 484848).

It follows the study initiated to investigate the syndrome of computer dependency and to see if obsessive dependency is detrimental to psychological and social development.

Volunteers who admitted they were dependent on micros were compared with control groups of non-dependent micro owners and people who did not own a micro.

As expected, the micro-dependent individuals, mainly well educated males, spent significantly more time computing than the other groups but were found to use computers in a more exploratory and self-educationl manner, rarely having a definite end product in mind.

Investigation showed that the micro-dependent people had experienced different types of parenting from the control groups leading them to become object rather than people centered at an early age.

This bias had been perpetuated throughout life, leaving them shy and unable to form satisfactory relationships.

Their lives had become dominated by task and object related activities with computing being the ultimate hobby which offered them a controllable form of interaction which they had not been able to find elsewhere.

Although some marriages had suffered because of the micro dependency of one partner, most volunteers were quite happy about their dependency.

They felt the positive benefits gained by their use of computers far outweighed any disadvantages.

Most had increased their social circles, had gained in confidence and self esteem and had improved their job prospects.

The research disproved the hypothesis that computer dependency is detrimental to an individual's social and psychological development. Findings suggested that it is in fact theraputic, providing an outlet for high level intelligence, curiosity and originality.

Lots more for the Arc

CAMBRIDGE International Software (01-833 4023) has promised a tall order of Archimedes programs on the run up to Christmas along with the first of its four game Hyperpacks. It is also hoping to produce BBC Micro conversions on many of the products.

Sales director David Kelly told *The Micro User*: "We are working hard to get the full list out on the Archimedes before Christmas. Hopefully we will also be able to produce some of the BBC Micro conversions ready for the Christmas market".

Memory Magic is a memory testing educational pack costing £24.95. At £19.95, Alien Fighter is a flight simulator based on the arcade game After Burner. Racer, costing £19.95, is a car simulation based on Out Run. Confusion II at £24.95 is billed as the world's first true 3D Breakout clone. Rom Wonder I, II and III are a compilation of three arcade games costing £24.95. At £64.95, is the 512 colour art package Ham Paint with plans to launch Ham Paint II at £95.95 and Super Ham Paint at £190.95.

Costing £34.95, Drummer 1/2/3 is a drum synth allowing the user to change the drum waveform with 8, 16 and 24 track playback. Energy at £24.95 is another educational pack that is all about energy and how it is used today.

A fantasy role-playing game based on Dungeon Master is Time Lords, costing £24.95 and new word processing package Hypercheque is listed at £99.95.

The Year 3000 costing £19.95 is a 3D solids game based on Elite. Footy, £24.95, is a 3D digitised soccer simulator. Arcade Construction at £32.95 is an arcade game creator based on Shoot-'em-Up Construction Kit and the six disc Jimmy at £62.95 is a cartoon game with similar effects to Dragons Lair.

Following the 12 game Hyperpack, CIS has been working on the first of its four game mini-packs. This is likely to lead off with Fireball II with Guild of Thieves, Robo Cop or Batman as other possibilities. Price will be between £40 and £50.

Tray-sized printer

TECNITRON Data (0753 31292) has launched a new desktop printer the size of an average intray. Its the OKI Microline 380 which prints at 180cps in utility mode and 60cps at letter quality.

With versatile paper handling facilities, the Microline 380 is capable of double height and width printing with high resolution graphics and costs £516.

PipeDream takes on Risc

THREE-in-one word processor PipeDream is now available in a Risc OS version specially developed for the latest BBC micro the A3000 and Archimedes 400 machines by Colton Software (0954 211472).

New features of PipeDream 3 include the ability to load many documents at once in separate windows, background recalculation, context sensitive help, automatic loading and saving of files.

The essence of PipeDream

Turn to Page 11 ➤

BEST OF BEEBUG

Applications II for the BBC Micro and Master Series

Share Investor
A useful program which not only allows you to monitor the fluctuations in share prices, but also assists the decision making process when buying and selling stocks and shares.

Running Four Temperatures
Monitor the temperature of your home, greenhouse, fish tank or even fridge using this four channel temperature probe project. Associated programs allow for calibrating and plotting temperatures.

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A month-to-view calendar which you can use with your favourite word processor to enter your appointments and print out for handy reference.

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Define foreign language character sets for screen and printer in French, German and most European languages. Test your knowledge in foreign languages with the accompanying programs and sample French-English files.

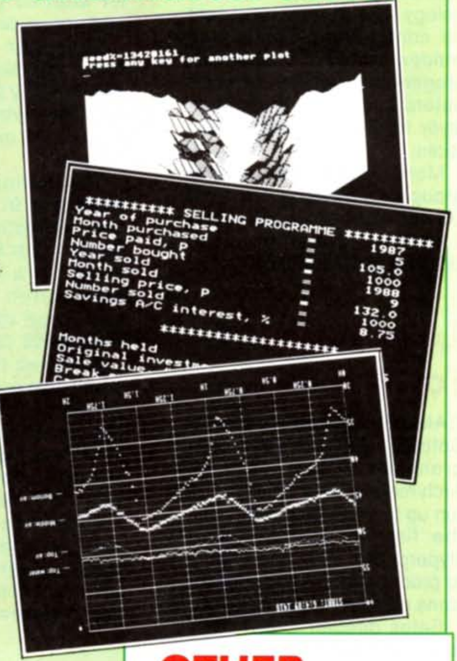
3D Landscapes
Create an infinite number of computer-generated three dimensional landscapes with this program.

Real Time Clock
Your can have a very useful real time digital clock displayed permanently on your screen. The clock will work in any mode and on any machine, and will even provide an alarm when necessary.

Label Processor
Do you need to create your own labels? This program will help you design and save labels quickly and easily, and print them at any size on an Epson compatible printer.

Crossword Editor
Design and edit your own crosswords or use this program to solve crosswords and anagrams. The program can optionally access Spellmaster.

Julia Sets
Fascinating visual programs for Basic II and Basic IV displaying Julia sets, the extensions of the Mandelbrot set.



```
seed%=-13428161
Press any key for another plot
```

```
*********** SELLING PROGRAMME ***********
Year of purchase                =      1987
Month purchased                 =         5
Price paid, p                   =     105.0
Number bought                   =      1000
Year sold                       =      1988
Month sold                      =         9
Selling price, p                =     132.0
Number sold                     =      1000
Savings A/C interest, %         =      8.75
             *********************
Months held
Original investm
Sale value
Break
```

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FOR THE BBC MICRO & MASTER SERIES
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From Page 9

3 is its ability to mix words and numbers in any required format and at any time. It incorporates facilities for spell-checking, search and replace, blocking and mounting text and easy correction of mistakes.

Suitable for use on all Archimedes systems with Risc OS and 1Mb of memory, it is compatible with all desktop screen modes and filing systems including Econet LANS and costs £169.

Software distributor raided

GST Software Products has struck a decisive blow against alleged piracy giving other software houses a lead which has been applauded by FAST, the Federation Against Software Theft.

Suspecting its former French distributor of copying its products, GST went into action and took out an injunction. This led to the biggest police raid of its kind in France and will end in a court case over alleged large-scale counterfeiting.

At the centre of the allegations is Wings Micro Electronics which had a substantial amount of material seized when its Paris base was raided.

Responsible for GST's strong action was managing director David Rose who told *The Micro User*: "When our suspicions were raised, we engaged an excellent English speaking French lawyer who had experience in this field. On his advice we obtained a "cease and desist" injunction which was issued by a magistrate and led to a raid involving police, bailiffs, a lawyer and a technical expert.

"If I had a message to hand on from this, it is that software developers should not be afraid of taking action if they suspect that their products are being copied. We found that the French legal system acted very well on our behalf. It was surprisingly quick and comparatively cheap.

"I would like other people to be able to benefit from our experience if they consider taking similar action. That is why we are keen members of FAST".

Huntingdon-based GST, which publishes the Acorn DTP package for Archimedes machines, was supported in its actions by Digital Research and Timeworks Inc who both believe their trademarks have been infringed.

It has now taken on Brittany based Guillemot as its authorised French importer and has been in contact with its French customers to put matters right with them.

Commenting on GST's stand, Bob Hay of FAST said: "The company is one of our members and we give it our full support in the action it has taken. What is apparent from this is that the copyright law is working well in France".

Musical meetings

ELECTROMUSIC Research (0702 335747) has opened what is claimed to be the first computer music learning centre in the UK. Equipped with a wide range of the latest Midi instruments, video and computers, it is based in Southend and initially will provide one day courses during holiday periods and at weekends.

The centre has been in the pipeline for two years with EMR providing more and more seminars to education and user groups in the UK and Europe, particularly on the Archimedes. Courses will be under the direction of Mike Beecher whose music demonstrations at exhibitions are well-known.

Applications for courses are now being taken. They will start over the Christmas period and into the New Year for the Archimedes and EMR's Arpeggio Music System. Full details of courses can be obtained from EMR CMLC, Suite 1-3, 50 Hamlet Court Road, Westcliff-on-Sea, Essex, SS0 7LX. EMR has also launched a new product which is out of tune with its usual music programs.

EMR Tower 3000 is a hardware support system for the A3000. It includes a metal stand, monitor plinth and tower section for holding expansion cards.

It accepts all standard cards used with 300 and 400 series micros and operates combinations of up to five single width or three full width cards. The tower unit also accommodates a hard disc. Price £299.

Also new from EMR is SMPTE, an Archimedes expansion card designed for use with EMR Studio 24 Plus, Version 2 software. The card allows video and audio tape synchronisation and costs £149.

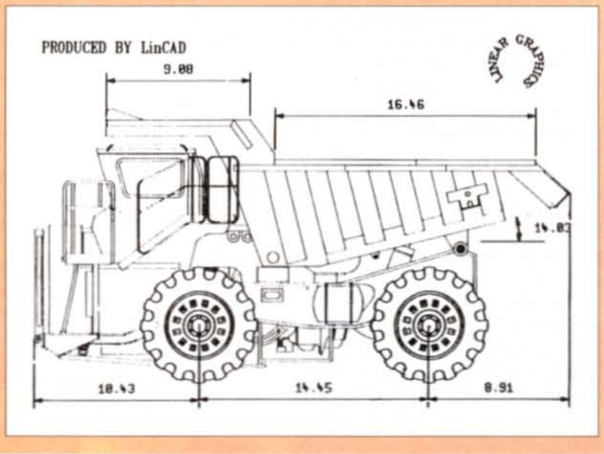
Alps joins the Cops

ALPINE Software (0762 342510) has released two new products for the Archimedes series. Alps (Adventure Language and Programming System) is the Archimedes version of its BBC Micro adventure creator and Cops is a text adventure with graphics.

Archimedes ALPS is Risc OS compatible and needs at least 1Mb of ram. It comes on an 800k disc with a 42 page reference guide and a 28 page introductory guide which takes the user step by step through the creation of a simple adventure. Adventures can include up to 1,000 locations with up to 255 objects.

Archimedes ALPS costs £32 plus £1 postage and packing from Alpine Software, PO Box 25, Portadown,

Turn to Page 12 ➤



Draughting on the Arc

LINEAR Graphics (0686 629292) has now released LinCAD Archimedes, an advanced design, draughting and graphic communications package which is the foundation for a sophisticated 2D computer design tool.

Designed with ease of use in mind, LinCAD Archimedes provides a practical solution to the problem of switching between drawing and real-world environments and has a wide range of uses in education. It makes extensive use of pull-down menus and the number of keyboard or mouse strokes has been kept to the minimum. Comprehensive use is made of help screens and the package is self-adapting to the memory size and the monitor type of the Archimedes system in use.

The screen drawing area resembles an A3 draughting area with fixed notional 1cm intervals but the coordinate system can be switched from 0.1:1 up to 1,000,000:1.

LinCAD Archimedes costs £172.

From Page 11

Craigavon, BT63 5UT. Existing owners of BBC ALPS can upgrade by returning their rom, manual and system disc with £18 or in the case of cassette versions, £19.

COPS is for any Archimedes or A3000 with at least 1Mb of ram. The player spends a day with the cops of the Hall Street precinct and have to solve mysterious cases of robbery at the grade school and the disappearance of police chief Davids.

Mouse or keyboard can be used and COPS also features a Ramsave/Ramload facility which allows instant saving in memory without the need to have a disc handy or having to type in a filename. It costs £19.95 including postage and packing.

Refill plan for lasers

LAZERFILL (01-809 7576) is offering a service designed to reduce the cost of replacing empty laser printer cartridges. It boasts a cartridge refill and drum extension treatment for a broad range of laser printers.

Cartridges can be refilled at around half the cost of a complete replacement cartridge and Lazerfill will put about 30 per cent more toner into the cartridge than the original manufacturer.

More access to MicroLink

SINCE the new MicroLink communications service was launched, 39 extra telephone access points have been opened in various parts of the UK from Dunfermline in Scotland covering the Edinburgh area and down to Plymouth.

This brings the total number to 228 compared to the 63 which were peviously available over British Telecom's PSS network which MicroLink subscribers used before they switched from Telecom Gold to the independent Istel-Inet network on October 1.

This means that almost 100 per cent of the UK population can now access MicroLink for the price of a local phone call. Before the changeover, in addition to having to make longer distance calls, they also had to pay a PSS surcharge of 3p a minute.

"The next stage in MicroLink's expansion will involve setting up dozens more telephone access points offering high speed 2400 baud", said MicroLink chairman Derek Meakin. "This will be getting underway in the next few weeks and all new lines will incorporate MNP5 error correction".

The Level 9 team...moving into arcade field

Level 9 quits adventures

AUTHOR of more than 15 top selling adventure games, Level 9 Computing has announced it is to pull out of that market.

Latest release Scapeghost will be the last adventure from Level 9 (0934 814450) which is moving on to produce arcade style games and conversions using its programming system H.U.G.E. (wHolly Universal Games Engine).

"People have been declaring the death of the adventure market for years", said designer Peter Austin. "We feel that Scapeghost is an appopriate final release".

In the game players control deceased cop In-spectre Alan Chance and use his ghostly powers to clear his name of crimes he didn't commit. It costs £19.95.

"H.U.G.E. is a good name for the new Level 9 system", said managing director Mike Austin.

"It includes 165,000 lines of code and has taken 10 man years to develop. "We are confident that the acclaim that Level 9 has received in the past for its high quality adventures will be continue in the more arcade-orientated environment.

New business for the Arc

THE Micro-Trader suite of business programs from Meadow Computers (0256 892008) has been updated to work with the Risc OS on Archimedes machines.

Its 800k ADFS disc allows maximum flexibility of disc usage. Any accounts or stock program can be run on a single floppy disc with no disc swapping needed.New features include faster searches, improved accounts analysis and more scope for nominal ledger transactions. The sales invoice section has also been improved. Price £230.

Master mouse home

A MOUSE driver specially written for the 512 board has just been released by Tull Computer Services (0923 55673).

It enables Master 512 users to run a mouse with any standard PC applications such as the latest GEM, Microsoft Word and Autoroute instead of having to use the keyboard. It also enables programs which do not work without a mouse to work on the 512.

The package includes a manual with an extensive section for programmers and also includes a list of tested software. The driver disc contains a simple PC screen dump Rom image for 512 users and some example source files which complement the section on programming of the mouse. It costs £30.

Speed spells success

HOT cakes have nothing on the speed with which Aleph One's Arm 3 upgrade board has been selling, and speed is at the bottom of its success.

The plug-in board brings a three-fold increase in speed making the MSdos emulator comparable to a real PC – native Archimedes code runs like lightning.

Shortly after it was announced (see *The Micro User*, July) orders started to roll in before the autumn launch and the first batch was soon gone.

Aleph is currently operating a first come first served system, but hopes to catch up soon.

"Demand has been exceeding supply but this has not taken us by surprise and we are taking action to redress this situation. We are obviously very pleased", said Aleph's Lawrence Van Somerson.

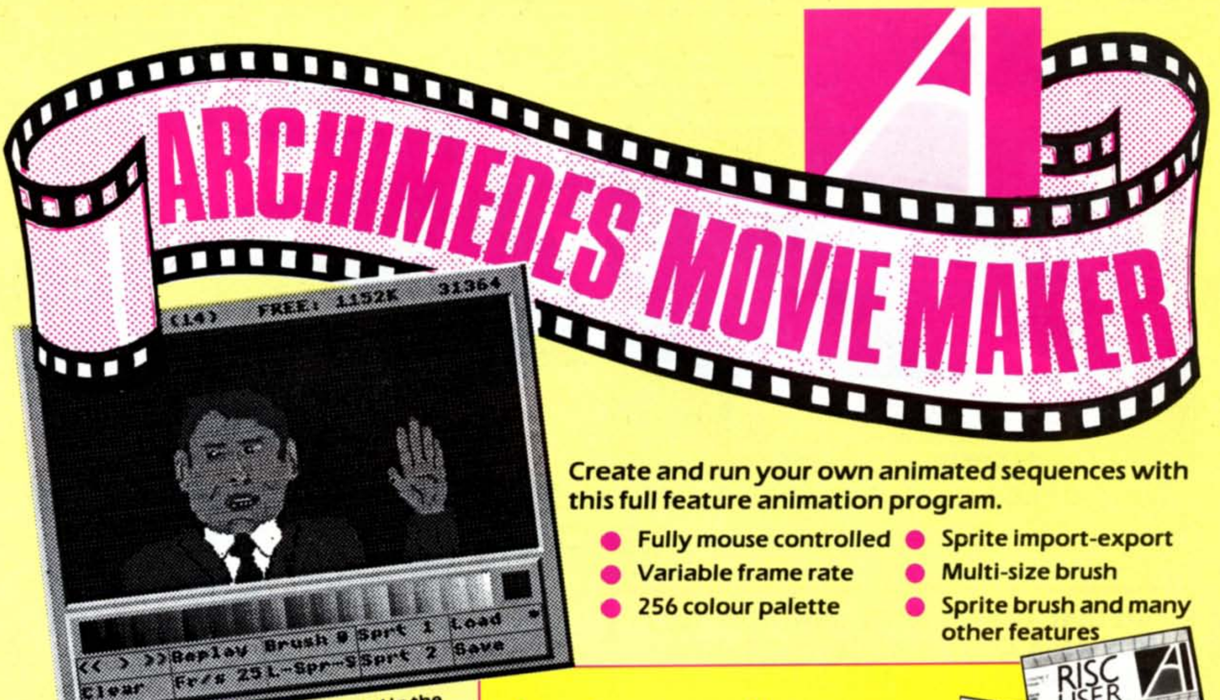
Arm 3 Upgrade costs £684.25.

Inspiration for musicians

PANDORA Technology (0202 745744) has launched !inspiration, a sequencing program which runs on all Acorn Risc OS micros with at least 1Mb of ram.

Featuring 99 reels, each containing 256 tracks, !inspiration lets the user to record, edit and play back Midi data. Colour coded displays enable quick assimilation of the necessary skills to transform musical ideas into reality.

Price, £399.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- **Sprite brush and many other features**

This program was recently featured in the pages of RISC User. It is now available on disc to members (see below).

SPECIAL OFFER

Subscribe NOW to RISC User and you can get the ARCHIMEDES Movie Maker disc at the members price of only £4.75 + 60p p&p. The Movie Maker disc is available to non-members at £15.00 + 60p p&p.

Just one of many...

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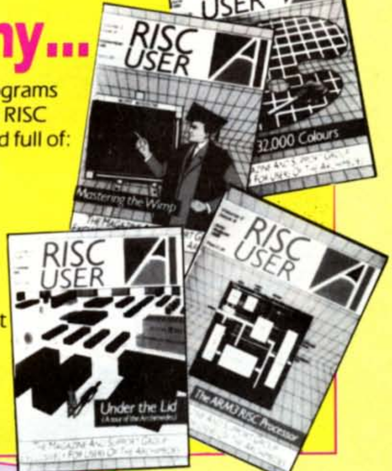
- useful applications
- smart graphical routines
- tutorial articles on getting the most out of your Archimedes
- plus reviews of all the latest for your machine



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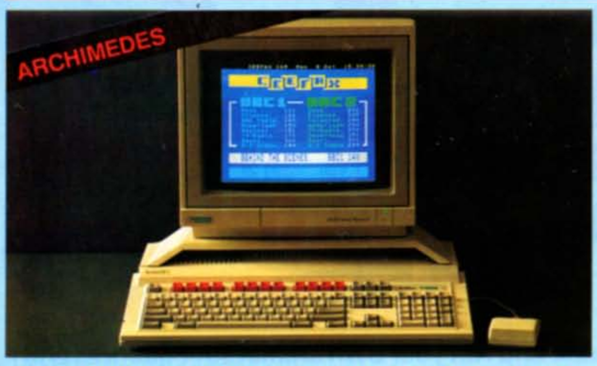

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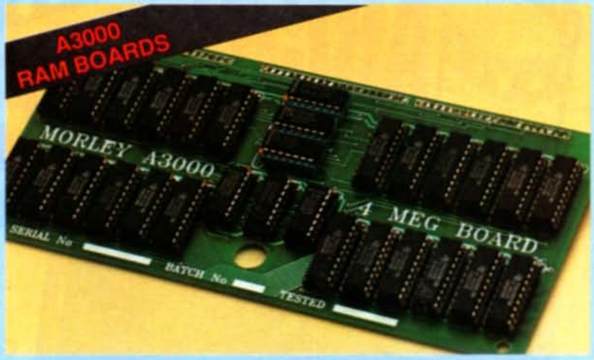

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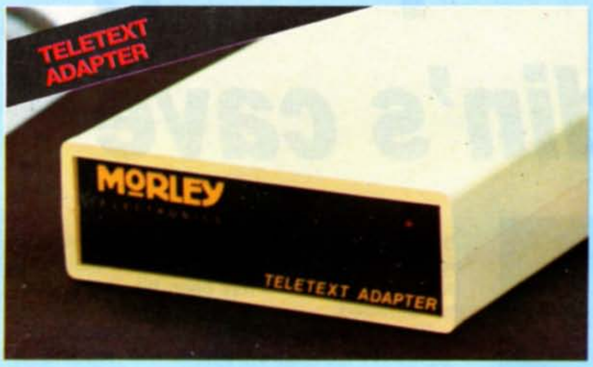

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The computing Aladdin's cave

THE Great Hall at Alexandra Palace will be transformed into a Mecca for computer enthusiasts in November when the UK's newest cross format exhibition, the Computer Shopper Show, comes to town. Timed to hit the start of the peak pre-Christmas buying season, it is the result of a brave but well researched decision by organisers Database Exhibitions and is sponsored by Computer Shopper magazine.

The Computer Shopper Show incorporates and replaces three established Database events, the Atari Christmas Show, the Electron & BBC Micro User Show and the Commodore Christmas Show. It will retain all the machine-specific attractions of these popular and successful exhibitions, add more besides and serve up one huge festive offering.

Something for everyone is the aim of the show which will open on November 24 and run until November 26. With more than 200 stands, it has been supported by exhibitors from all major sectors of the popular market and is expected to attract more than 30,000 visitors.

"We knew the concept of an all-format event in the run up to Christmas was what people had been waiting for but even we have been surprised at just how great the actual demand has been", said head of Database Exhibitions Michael Meakin. "The response from exhibitors and potential visitors has been far greater than we expected.

"For those three days in November, the Computer Shopper Show will transform Alexandra Palace into the number one Christmas computer gift hypermarket this country has ever seen".

The importance of timing for the Computer Shopper Show was underlined by sales director for Database Exhibitions, Mike Malone. "Positioned right at the start of the peak buying period, timing of this show has been a key factor", he said. "It has appealed to both exhibitors and visitors alike. As our promotional campaign has got underway, space at the show has become hot property, with the computer trade realising it is a must for their Christmas marketing plans.

"Similarly, the small business community and the computer buying public has realised that this will be the ultimate venue for buying computer products. We are convinved that we have achieved what we set out to do – to turn the Computer Shopper Show into the world's largest pre-Christmas computer shopping opportunity".

When visitors enter the Great Hall they will be treated to a vast selection of goods, from excellent hardware through the whole range of add-ons and peripherals to cut price games. Bargains galore will make it a must for the Christmas buyer, and the sheer volume of stands will give visitors a unique opportunity to compare the prices and merits of exhibitors from throughout the UK – an impossible exercise in normal circumstances.

Not only will Computer Shopper be the ultimate marketplace, it is also designed to be fun – a real festive start to the Christmas run-up. Typifying this concept, a circus theme will run throughout the three days and has been the basis of the high-profile promotional campaign. A robotic Father Christmas, wire walkers, stilt walkers, a strong man, clowns and even a baby elephant will be there to add to the atmosphere and help make Computer Shopper the greatest show on earth.

Your chance to win a trolley full of goodies

YOU have been set loose in an Aladdin's cave to grab what you want. The time limit is tight but the potential rewards are mouth watering. It's a dream that many may have had but for eleven lucky people it will become a reality at the Computer Shopper Show.

They will be winners of the various trolley competitions which have been running throughout the computer press and their reward will be that star in the competition prize firmament – the chance to complete a trolley dash.

Outside show hours the 11 lucky winners will be given a trolley, a time limit and some restrictions on what they can take, then set loose in the Great Hall at Alexandra Palace. Before them will be the largest single collection of computer goodies to be seen in the run up to Christmas and free aisles to get round as many stands as possible.

A large percentage of exhibitors have agreed to take part in the competition and allow their stands to be visited giving winners a unique chance to fill their Christmas stockings.

Debut for latest products

MANY new product launches, combined with firm favourites and a wide range of bargains, will greet micro users who visit the Computer Shopper Show. BBC games will feature in the range on offer from A & S Distribution (stand K18). "We'll be taking everything but the kitchen sink", said Alf Payne, who will also be offering joysticks on his stand.

Among the general supplies on offer from A1 Computer Supplies (stands E2 and L2) will be a wide range of computer furniture, mice, software and discs.

Admincure (stand A10) will be offering a range of computers, printers and accessories. Together with its stock of shareware discs and public domain software, Advantage (stand E12) will be featuring a selection of books and languages.

Star's range of printers will figure strongly on the Athene Computers stand (C3), where more than 500 discs of public domain software will be on sale.

AVP (stand K16) will feature its range of educational software for BBC Micros and Archimedes machines. Subjects include genetics, biochemistry, book-keeping, life skills and chemistry.

Audio Visual Research (stand H12) will be demonstrating Archimedes Replay, a new sound sampler for Archimedes machines.

On stand K4, Beebug will be unveiling a range of new products for Archimedes machines. Companion is a hard disc utilities package featuring an easy-to-use backup utility, Spark, a file compressor and archiver and File Find, a fast utility for locating files on disc or network. It costs £39.10.

Also from Beebug is Scavenger, a professional 400dpi scanner which adds life to DTP, word processing, drawing and painting by allowing photographs and drawings to be incorporated into documents. Both hand-held and full width A4 versions are available costing £198. 95 and £399 respectively.

The Desktop Publisher is a new DTP package offering unrivalled features allowing the creation of professional pages for leaflets, newletters, adverts and posters. It can also be used as a word procesor for typing letters and documents and costs £148.35.

ISO C from Beebug is a C development sytem consisting of a relocatable module containing a powerful compiler and linker. Using the Wimp-based editing environment, users can enter a program, click on the run option and ISO C will do the rest. It costs £79.35. The company's popular communications package Hearsay will also be available. Providing emulation for VT 102, Prestel Tektronix and most file protocols, this package costs £69.

Claming to have produced a new concept in disc labelling, BlackStuff will be letting show visitors into its secret on stand F3. Its Polly Erasable Label kits are wipe clean. As files are deleted and overwritten the Polly label can be updated accordingly, making scribbles and illegibile alterations a thing of the past. For £13.74, the kits are packed in a desktop canister which contains 50 everlasting labels, the solvent and erasure pen, fast drying fine line marker pen, cotton wipes and circular colour-coding labels to help disc classifications.

Bowthorpe EMP (stand J6) will be offering its comprehensive range of surge protection devices. Adventure Soft (stand M8) will be selling a range of software at discount prices and a selection of printers wll be offered by Caspel Computer Services (stand A3) along with its Ribbon Refresh package which allows up to 30 printer ribbons to be re-sprayed.

Club 68000 (stand L1a) is a mail order house specialising in discounted software, plus some interesting hardware accessories, and a selection of surplus computer equipment across many formats will be on sale at bargain prices from Commonside Hardware Services (stand J7).

A number of new titles will be on sale from Computer Manuals (stand S11) which will also be offering damaged books at knockdown prices. Discount prices will be offered by Conceita Micro Systems (stand J11) which will feature a range of Deskjet printers and well known discs. From Dabs Press (stand K12) there will be a selection of new books in the Dabhand Guide series.

From Dowty Power (stand C6) will come a selection of uninterruptable power supply equipment. Specifications range from 315Va to 126Va and 1KVa to 5KVa with prices ranging from £299

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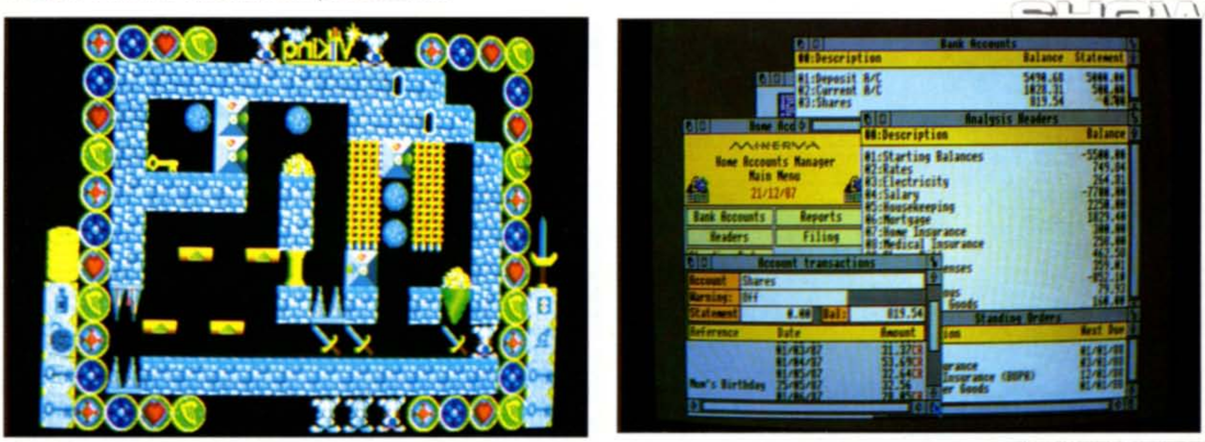


Games and business packages can be found on the Minerva stand to £4,989.

A selection of discs, disc storage boxes and Panasonic printers will feature on the Mediaware stand (S5). Star and Panasonic printers, discs and disc boxes will be sold by Ealing Computers (stand B1b).

A new range of discs which feature software protection built into the shell will feature strongly on the stand of Escroe (A8), specialists in volume sales of discs ranging from 2.8in to 8in. A wide range of discs will also be the speciality of First Stop Computer Supplies (stand F7).

Fourth Dimension (stand K14) will have its current range of BBC and Archimedes games including Holed Out and White Magic. Also available will be several new arcade games including Arcade Soccer for the Archimedes and UIM (Ultra Intelligent Machine) for BBC Micros and Archimedes.

Graduate Computing (stand L9) will be choosing Computer Shopper Show to launch its first education package to cover the new national curriculum. The mathematics program for Archimedes computers has four key stages covering children from five to 16 and aims to coach them through all aspects of the new curriculum. It costs £20.

On the FM Computer Supplies stand (L18) visitors will be treated to what is billed as the largest collection of storage boxes in the country. Stands, copy holders and replacement mice for a wide range of computers will also be on sale at very competetive prices, said FM boss John Taylor.

HSV Computer Services (stand S9) will be offering a range of discs, ribbons and accessories and Hewson Consultants (stand M7) will be displaying its wide range of games software.

A selection of software including games from US Gold, Kyx and Gremlin will be on offer from In Store Marketing (stand M15) and Kador (stand M4) will have its range of seal'n'type protective keyboard covers together with the Keytops series of stick-on labels for converting keyboards to other languages. The company will also be giving details of its courses on re-charging laser cartridges.

Thingi Computer Supplies (stand M11) will debut Thingi, Thingi 2 at the Computer Shopper Show. The new document holder is a much enhanced version of Thingi 2, injection moulded with a special gravity clip allowing documents to be positioned. It costs £8.61.

A range of software, peripherals, disc boxes and joysticks to cover all formats will be available from MCD (stand B12) and the peripheral market will also be served by MD Office Supplies (stands A2 and S15). Main Media (stand B2) will be selling discs, disc boxes and accessories.

Database Publications (stand B6) will have current editions of its five computer titles on sale, including *The Micro User*, plus back copies for readers to fill in their collectons with issues they may have missed.

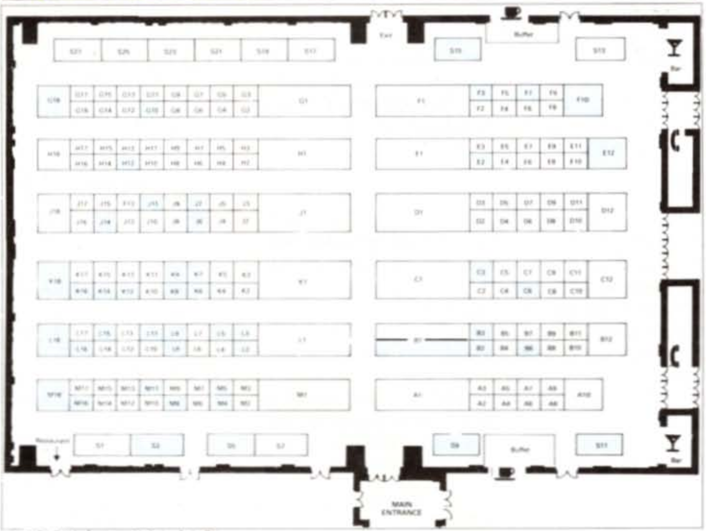
Magnetic media, data buffers, disc drives and uninterruptable power supply systems will be among the range of computer accessories from Manor Court Supplies (stand G18).

New from Minerva (stand L3) will be MultiStore, a database for Archimedes machines. It allows a number of database files to be opened, each showing its card format in a separate window on the desktop. These files can contain a practically unlimited amount of data and may be linked together so that relationships between files are automatically tracked by the software.

The records may be searched at speed by any of their key files or indices, finding cards in under two seconds from any size of database. Full macro handling allows all types of processes and calcuations to be automated. A notebook is provided for each file to store details of commonly used searches, mathematical formulae, sort definitions and macros. MultiStore costs £299 and

How to find your way round

The blue markers indicate stands stocking software and hardware for Acorn computers.



HOLED OUT
PINE ISLES
HOLE 1
PAR 4
LENGTH 481
STEVE 4
WIND
1 WOOD
SELECT CLUB
RANGE 45
ON FAIRWAY
CLUB POWER METER 02
LEPRECHAUN
TIME:2322
SCOR:000040
ENCHANTER
TITAN
WARRIOR
IN THE BEGINNING...

There will be games galore at the show

will be unveiled at Computer Shopper Show along with many of the other Minerva packages specially desiged for use with the Archimedes.

On offer from Modem Marketing will be its new EC2400 modem which was launched earlier this year. The package covers all four speeds currently used worldwide, including V22bis and is fully Hayes-compatible at a price of £279.

Discs for all machines will be among the OMD products on stand M18; a selection of discs, storage boxes and mouse mats will be available from Quantum Computers (stand L8) and Reflex Magnetics will be selling a wide range of discs on stand M5.

A range of products for the BBC Master will be seen on the Morley Electronics stand (K7). This will include Eprom Programmer, the AA Master Rom board, Master Rom cartridges, Mastercopy, an ADFS/DFS file copier and a variety of hard discs including 20, 30 and 40Mb units complete with utility software.

On stand M18, OMD will feature a range of accessories and peripherals including discs for most machines.

Pres (stands K8/K9) will be selling its unique range of plinths and expansion units for Acorn's latest micro, the A3000. Pres has now shown itself to be the main exponent of the A3000 add-on (see *The Micro User*, September 1989).

Supporting the important education market will be Rickett Educational Media (stand L11) which will be taking a selection from its 1,000 program catalogue along to Alexandra Palace. Favourite will be Granny's Garden, one of the top selling educational programs for children aged six to eight.

Leisure and cut-price business software for Acorn machines will be offered by SDC on stand J14 and on stand H6, ST UK will have a series of disc boxes and other accessories.

A selection of computer furniture will be displayed by Tirith on stand B3, and Tynesoft (stand F10) will be hoping for good pre-Christmas sales with its wide selection of games. Top of the list will be its Christmas release Beverly Hill Cop plus Elvira, Mistress of the Dark, on the Horrorsoft label.

Towerhill (stands L15/L16) promises a number of pre-Christmas bargains among its selection of BBC Micro software and on stand L5 Hampshire Micros will be offering a wide range of cut price computers, monitors, printers, software, disc drives and peripherals. Archimedes computers will feature on its stand as will Epson, Star and Panasonic printers.

Videk (stand G10) will be selling a range of cables for almost every computer, and Hampshire Microcomputers (stand L5) a wide range of peripherals including Epson, Star and Panasonic printers.

On stand K2 Westoning will offer a range of computer consumables, and Wrighton Publications (stand S3) will have a selection of computer manuals to cover virtually every machine. The company will also be offering subscriptions to the Computer Users' Book Club. Membership is free, and the only proviso is that at least three books are bought in the first year.

Wight Scientific (stand M16) will be displaying its popular SignWriter package for BBC Micros and Archimedes. This design tool has many uses, including travel announcements, theatrical posters, company logos, printing foreign alphabets and preparing low-budget newsletters. The BBC Micro version costs £29.95 and the Archimedes version £49.95. Wight will also be offering its label printing program LabelWriter for the BBC Micro. It costs £23.

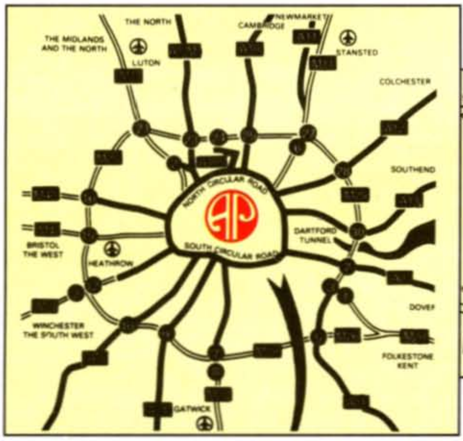
So easy to get there

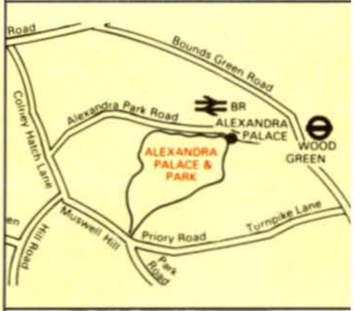
EXCELLENT communications make Alexandra Palace the ideal venue for the Computer Shopper Show.

By road the show is just 15 minutes from junction 25 on the M25. There is free parking for hundreds of cars.

For rail travellers Alexandra Palace has its own British Rail station a nine minute journey away from Kings Cross. A free shuttle bus connects the station to the show.

Admission charges are £4 for an adult and £3 for children under 16, with a £1 discount for prepaid tickets. A special prepaid family ticket is also available for £9 which will admit two adults and two children. Prepaid prices can only be obtained by pre-registering on





A special section for businessmen

A SPECIALIST feature of the Computer Shopper Show has been designed to attract a minimum of 5,000 buyers from small businesses, many of them looking for a micro for the first time.

The Small Business Advisory Centre is a new concept developed jointly by Database Exhibitions and Computer Shopper magazine.

It will be supported by Apricot Computers which has agreed to link up with leading UK business software houses to present a non-stop display of the benefits of networking to small companies.

The Department of Trade and Industry will send along experts from its Enterprise Initiative scheme to offer advice and a leading firm of accountants will be there to give financial pointers.

"We are going to offer the small businessman the most comprehensive source of information ever provided at a computing event", said sales director of Database Exhibitions Mike Malone. "We are firmly convinced that no previous computer show has ever adequately addressed this area of advice for small businesses. Computer Shopper will fill that gap".

CHRISTMAS SPECIALS

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All metal case with rotary switch

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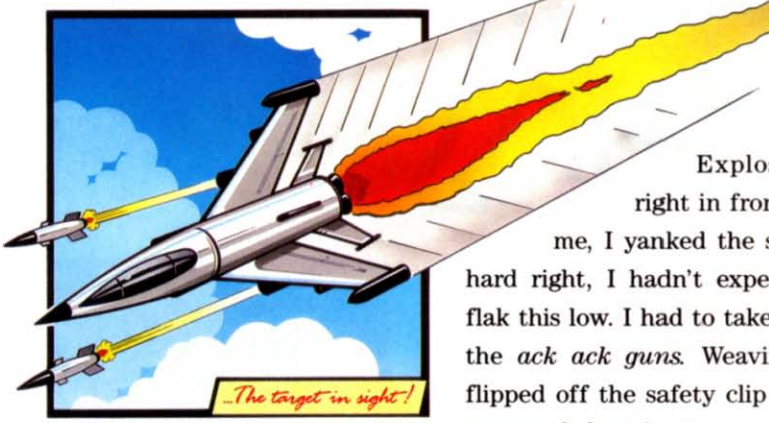
"I HIT THEM AT FULL THROTTLE...


...The target in sight!

...NOW I'VE GOT TO BLAST MY WAY OUT"

It was getting hot, a couple of SAMS *(Surface to air missiles)* had taken out my escort. I'm on my own.

Going in low was my only chance, got to get under the radar cover. I banked right into the valley basin and started to follow the river, the target could only be minutes away.

BANG!!!

Explosion right in front of me, I yanked the stick hard right, I hadn't expected flak this low. I had to take out the *ack ack guns.* Weaving I flipped off the safety clip and squeezed the trigger.

All I could hear was the deafening roar of *30mm cannon fire,* I watched the tracer burn down to the ground and pop the ack ack like crackers. The bridge was getting closer, over or under? Over and radar would pick me up faster than I could say... Fast, Under and, well, I might not make it.

Some choice, I went under and... I made it, straight into a hail of cannonfire from an enemy patrol fighter, I pulled the stick all the way back, he couldn't match my climb, before he knew it I had dropped on his tail and seconds later two of my *air to air missiles* had ripped him apart... Eat that sucker.

They were throwing everything they had at me now, I was on top of them, I went in on full throttle, they didn't know what hit them.

Five full passes, sure, I got bruised, but nothing compared to the carnage on the ground. Spires of smoke, earthshattering explosions. I had pumped everything I had into them, now I had to blast my way out.

Interdictor is the ultimate in realistic flight simulations. Giving you total control of a high performance modern jet fighter.

It runs on all Archimedes computers with at least 1 MB of memory including the A3000 BBC Micro. At your disposal is a breath taking array of graphics, faithful in almost every detail to a genuine combat mission.

Can you capture all the airfields, can you stop the supply trucks whilst utilising your flying skills in the air. It's up to you with *Interdictor.*

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1:Choose the centre
2:Choose the radius
Note: The 2nd point is on the circumference of the circle.
The usual shape flags are observed - see line etc.

Set Fill Style

TILT 343
LEAN 39
X AXIS SCALE
Y AXIS SCALE
Points Used 4
Atelier

"- I didn't think that there was room in the market for another art package of any quality but I was wrong........along comes "Atelier" from Minerva Software and what an art program it is!.......It takes the computer art program to a new level !" *(A & B Computing August 1989) -*

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UPDATE

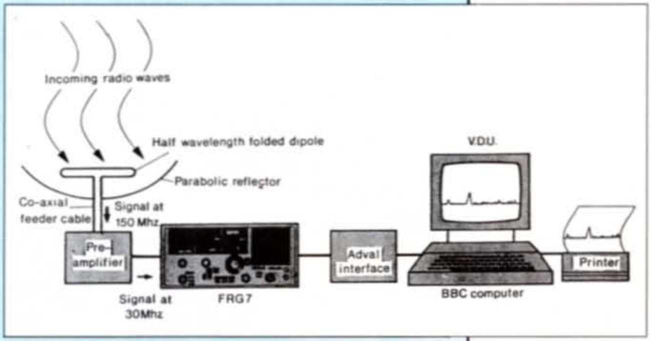
BBC Micro heads for the sun

PUPILS at Taunton School, Somerset, sponsored by the Royal Society, have hitched a BBC Micro to their radio telescope for research into sunspots.

The micro, used as a communications receiver, measures and stores changes in voltage which are received by the school's eight metre parabolic dish. Sixth formers then use this in their research project which is seen as a useful backup to A level studies, combining physics, computing and electronics.

Trained on the sun, the dish picks up changes in voltage from cooling effects of the magnetic fields in sunspots. They are transferred via the reflector to a half-wavelength folded dipole tuned to 150MHz. A pre-amplifier boosts the tiny alternating current signal and converts it to 30MHz before passing it to the main FRG-7 short wave communication receiver. This further amplifies the signal to produce a small dc output fed directly into the BBC Micro which measures and displays the signal on a VDU.

Trevor Hill, head of physics at Taunton School, told *The Micro User:* "Most exciting results for the pupils came shortly after the telescope had been set up. We picked up unusual variances in signal which was the sign of a solar flare, a very large output of energy. This coincided that night with very spectacular Northern Lights"



BBC Micro link-up to the radio telescope (left)

Hi-tech centre opened at Oxford

THE Oxford Schools' Science and Technology Centre at Oxford University's prestigious Clarendon Laboratory, has been officially opened by the Chancellor Lord Jenkins of Hillhead. Equipment for the centre was supplied by Acorn Computers and includes Archimedes 400 and A3000 machines.

The centre will be used by teachers on a national and international basis for a wide range of applications including the provision of IT information and support, research and software development. A further function will be to establish the new European Technology Education Database which will operate on the Acorn R140 Unix workstation.

Managing director of Acorn Computers, Harvey Coleman said: "As the leading supplier of micros in schools in the UK, Acorn takes an encouraging and enthusiastic interest in IT developments in education. We are extremely pleased to have been chosen as a supplier of computer equipment for this exciting new project.

"In particular, we are delighted with the growing interest in our new range of Archimedes computers and the BBC A3000 machine from teachers in Oxfordshire schools. We are glad that this centre will be yet another addition to our national network offering local support to schools".

UK software goes down under

EDUCATIONAL specialist Sherston Software (0666 840433) has proved that good programs travel well. Such has been its success in Autralia that it has now set up its own distribution network down under.

"We have been selling extensively in Australia

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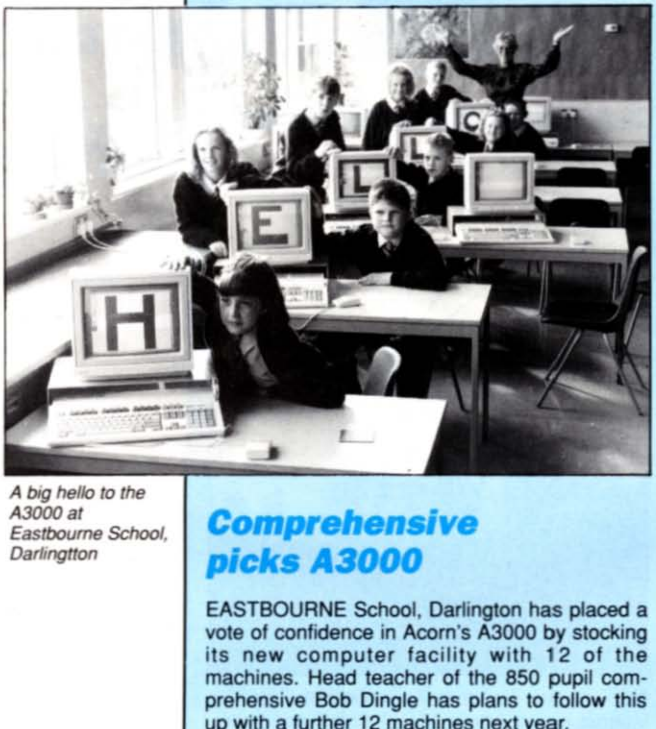
◀ From Page 23

for some time but we have had problems with using a number of different distributors over there", said partner Bill Bonham. "We have built up a reputation in this country for 28 day free approval to schools, special low introductory prices and good backup services.

"This is the sort of reputation we also want to build in Australia, and we have decided that handling the distribution ourselves is the only way to do it". Roger Thompson of Sherston has now gone to launch the new office in Perth.

Sherston has recently announced network versions of its popular programs The Microbugs and Mapventure. The Microbugs is an information technology adventure for 9 to 14-year-olds. It costs £63.25 for networks. Mapventure is a simulation for 9 to 14-year-olds and costs £52.44.



A big hello to the A3000 at Eastbourne School, Darlingtton

Comprehensive picks A3000

EASTBOURNE School, Darlington has placed a vote of confidence in Acorn's A3000 by stocking its new computer facility with 12 of the machines. Head teacher of the 850 pupil comprehensive Bob Dingle has plans to follow this up with a further 12 machines next year.

"The decision to move over to the A3000 was made partly on the recommendation of our local computer advisor, and partly because we think it is an extremely good machine to meet the needs of our pupils", said Mr Dingle. "When further TVEI funding become available next year we hope to double the number of machines ".

A handy aid to spelling

SPELLING expert Charles Cripps has developed what is claimed to be the first spelling program directed at the national curriculum attainment targets for spelling and handwriting. Called Hands On Spelling, it comes from ESM (0945 63441). A pioneer in his field, Charles Cripps supports the view that children should be taught joined-up handwriting from the earliest age. His research shows that this improves a child's grasp of spelling and that ideally, the two should be taught together. Price £31.62.

Words are built on screen around their particular letter pattern and children have a chance to see words being handwritten in flowing, joined-up strokes on the screen. This demonstrates not only how a word is spelled but also correct letter formation. A built-in assessment program is included and a concept keyboard can make it of use to the youngest child.

New connections for Archimedes

SCHOOLS computing specialists Phobox Electronics (0305 853767) and Stour Software have developed hardware and software which allow existing interfaces and control boxes to be used with Archimedes micros allowing schools to combine their existing investment with new technology.

Control boxes which use the BBC B and Master printer and user ports can now be controlled by any Archimedes with a user port fitted. That is with an I/O expansion card for 300/400 machines or the user/Midi expansion card for the A3000.

The software products available are Connect Toolbox, a relocatable module of 19 star commands for inclusion in Basic programs and Connect Logo, an addition to Archimedes Logo for use by children of all ages. The toolbox commands allow real-time on-screen display of input states in the user's choice of colours and fine control of power levels on all eight outputs with a choice of seven levels. It costs £16.50.

Logo is available as an enhancement to Toolbox at £8 or packaged with Toolbox at £22.50. Existing control boxes which have two leads for printer and user ports can be connected to the Archimedes range using a printer port lead which costs £6 or a printer port plug convertor costing £12. Users who wish to keep their printer connected can use the Phobox User Port Expander which costs £25.

User Port Expander, Connect Logo and Connect Toolbox are available singly or as a package costing £45.

Folio extended

FOLIO, one of the UK's top software packages for primary schools, is being further developed to run on Archimedes computers. The decision is backed by Acorn's belief that the A3000 will be widely used in the primary sector.

Development is being carried out by ESM in conjunction with Folio's original author, Chris Page. Folio provides an easy-to-use structured writing environment to help pupils use language creatively. Prototype versions have been on trial in schools during the autumn term.

The Hybrid Music System

"There is no comparable integrated music system for any micro."
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The 5000 is a complete package for your BBC Micro, giving you the power to carry any piece of music from entry and arrangement to final performance with high-quality instruments and studio effects. Comprehensive software lets you enter music in conventional notation or easy shorthand, arrange phrases and parts in any combination, design instrument sounds and adjust instrumentation, volume, balance, and tempo while the music plays.

The software includes the AMPLE language, offering you unlimited scope for control of music and sound material, and opening the door to a wide community of users and experts exchanging music and advice through user groups, magazines and bulletin boards.

The 5000 package includes a 16-channel stereo synthesiser, software on ROM and disc (including many example pieces) and a 162-page illustrated User Guide, requiring only a 5-pin DIN lead to connect to your existing hi-fi. *£140*

ALSO AVAILABLE

AMPLE Nucleus Programmer Guide, music albums (15 titles), speakers, headphones, accessories.

MUSIC 4000 KEYBOARD

Together with the 5000, the 4000 gives you a complete desktop music studio. Perform with any of the 100 supplied sounds or design your own, record with multi-tracking, edit and print-out in musical notation, and much more. *£146.96*

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The 3000 provides another 16 sound channels, expanding your system to a colossal 32. Use more instrument layers, more musical parts, more voices per part, more echo/reverb effects and more outputs – stereo or quad. *£100*

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MUSIC 1000 AMPLIFIER

An alternative to your hi-fi, the 1000 turns your system into a self-contained workstation, ideal for the study or classroom. Use it with speakers and up to three headphones, mixing-in the computer's own sound. *£140*

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J71

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- ★ *Realtime on-screen music printing as you record or playback with automatic beaming & spacing*
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- ★ *Formatted music printout on a dot-matrix printer*
- ★ *Track Unmerge to take other multitrack Midi input*
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- ★ *Realtime graphics animation on-screen from external programs such as VuMusic and RenderBender*
- ★ *Drum "grid" edit page with unlimited drum lists*
- ★ *Graphic "Midi grid" page for easy note length editing*
- ★ *Multi-zoom and cycle on Graphic and Drum edit*
- ★ *New copy functions for repeat & transpose, multicopy*
- ★ *Extra quantization including track interpret and local*
- ★ *Realtime on-screen mixing for proportional variation of single or multiple track levels for both internal sounds and velocity-sensitive Midi instruments*
- ★ *Full music to video production when using EMR's SMPTE card with your video recorder. All studio timecode commands provided with SMPTE offsets*
- ★ *Music can be composed while viewing whole screen action and locators for precise sound to video sync*
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- ★ *Master Keyboard page allows any Midi keyboard to be a powerful multi-channel controller over 8 user areas*
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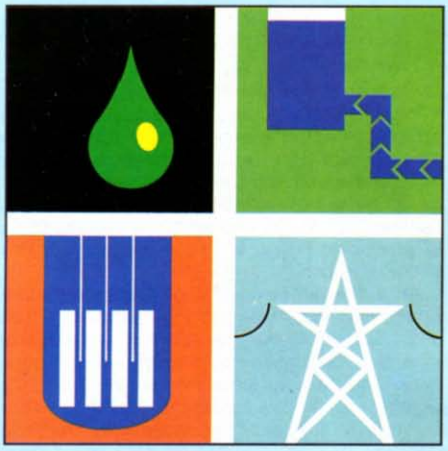
Trade-in with Confidence

Power computing

Phil Tayler joins the energy game

POWER Control is a computer simulation of a variety of power generating stations, along with a chance to control the National Grid, all on one 40/80 disc. Aimed at secondary schools and partially designed by practising teachers, it is a successful product which will be of great use in GCSE coursework. The screen displays are colourful and clear, so making them legible even if students are working in a group.



Simulations are available of coal or oil-fired stations, a pumped storage station or a nuclear installation — with a further option to control the nation's power network. It also allows the sound level to be set on a scale of zero to three, though the sound effects are modest and not really of great purpose.

When the students choose one of the power station options, they can decide to watch a step-by-step explanation of its mode of operation. Very cleverly written, but not over simplistic, it is accompanied by a schematic diagram animated in line with the explanation. Pressing Return to continue allows the program to proceed at the individual's speed.

A further choice allows the student to set up various conditions for the simulation to run under. For instance, in the pumped storage/hydro electric system the time of day and season can be selected. Then the assignment requires the energy produced to be matched to the stated demand.

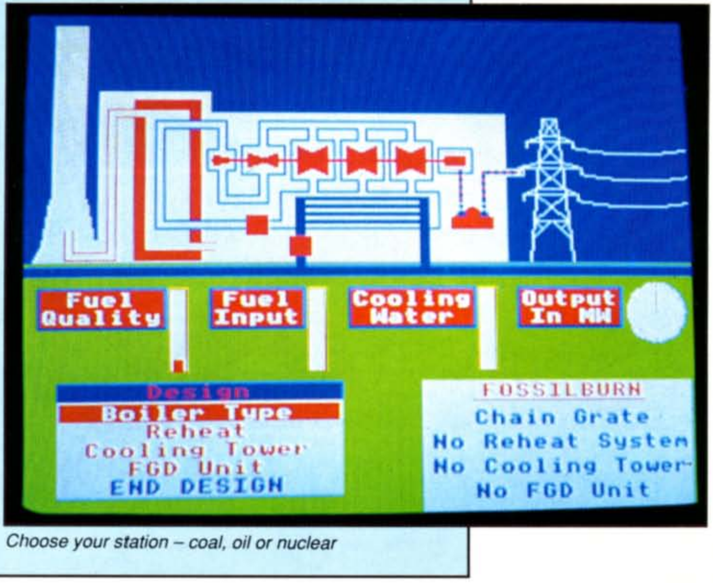
This obviously involves generating power at times of demand by releasing water through the turbines, the valve being adjusted for the required flow following the messages of expected demand. Then at times of spare capacity water can be pumped back up to the higher reservoir by reversing the flow. Rainfall is a variable which can make marked differences, and one which can be random or pupil-adjusted.

I found the lack of figures on the power output dial to be difficult and therefore less than realistic. Although they can be toggled on using f0, I cannot see the logic of not having them always available. The graphical data can be displayed for evaluation; again the values toggled on/off by f0. This allows the data including power output, volume of water stored and so on to be analysed on-screen or by print out.

The pressurised water nuclear reactor is a particularly difficult type to master and understand, needing much more reference to the manual. The StartUp sequence often seemed to lead to overload, although continued practice reduced the danger. There is an option to watch a sequence simulating nuclear fission within the reactor. Absorbing, the batch size and enrichment level both set by the student. Onscreen a graph shows the resulting power output curve.

The coal/oil station section is again clearly described and an opportunity given to alter the design of the fictional station. You can change the type of boiler, there are options to include a cooling tower or reheat system, as well as a very topical flue gas desulphurisation unit. Experimentation is encouraged to develop an optimum system, with further options to alter the

Product: Power Control
Price: £8.00 (to schools and colleges only)
Supplier: The Electricity Council, 30 Millbank,
London SW1P 4RD.
Tel: 01-834 2333



FOSSILBURN
Chain Grate
No Reheat System
No Cooling Tower
No FGD Unit

Choose your station – coal, oil or nuclear

◄ From Page 27

fuel quality or flow rate into the boilers.

What is really superb in this package is the option to control the network. A function key strip details a series of data tables. These include the demand predictions, weather forecasts, details of television programmes, maintainance schedules and even the relative costs of producing power from the various stations under ones control.

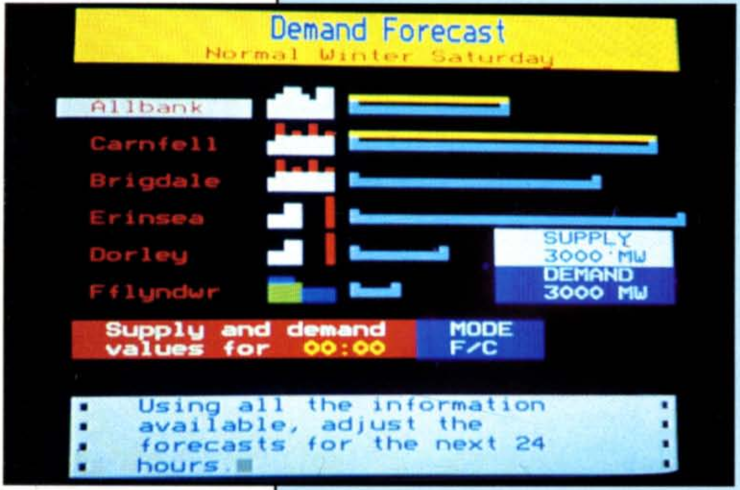
An authentic simulation of a telex machine brings new information to the controller, which often requires immediate action. I feel that this particular simulation could even prove a commercial success, as it has that certain something which makes you return for just one more attempt to forecast the increased demand because the Cup Final has gone into extra time. However, as an educational program it is very effective. At its heavily subsidised prices it is a bargain and thoroughly recommended.

The final feature from this virtually faultless package is the ability to dump screens to allow students to have a hard copy of their data, graphs and so on. Pressing f9 at any time allows a screen to be printed and obviously this could generate much useful work away from the micro.

The manual is a loose-leaf A4 file, with high quality printed colour booklets. Various diagrams of the screens are also included with very useful data. There are also a series of investigations setting challenges and including clues. With a variety of logging sheets and graphs this is an excellent package which deals with the complex and topical subject of power generation in a non-political and surprisingly non-commercial manner.

Summing up

This package is excellent value for money, beautifully presented with extremely useful information. It's a pity that it's only available for school use.



Demand Forecast
Normal Winter Saturday

Allbank
Carnfell
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Erinsea
Dorley
Fflyndwr

SUPPLY
3000 MW
DEMAND
3000 MW

Supply and demand
values for 00:00

MODE
F/C

Using all the information available, adjust the forecasts for the next 24 hours.

Weather and TV programmes effect demand

Bugs in the machine

Product: The Micro Bugs
Price: £8.75
Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire SN16 0LH.
Tel: 0666 840433

HE Micro Bugs is one of Sherston Software's range of graphics based adventures and the style is instantly recognisable — bold, clear Mode 2 graphics with smooth animation. It is aimed at upper juniors and well into the secondary school but retains the directness and ease of use we have come to expect from the infant and junior packages of the past.

The story behind the adventure is introduced in a very nicely illustrated story book — your micro has been invaded by two micro bugs. On booting up the screen goes blank except for the Acorn message — the bugs then appear and the players are invited to be shrunk to micro size to get rid of them. Thus abbreviated they follow the Bugs into the very depths of the machine itself. Initially they walk around the circuit board and find that there are certain chips that may be entered.

The **Main Logic Chip** contains a kind of platform game in which several robots must be freed, the players character moves from room to room pushing blocks around to assist with climbing the platforms. This sounds trivial but the problems are not simple and require a deal of thought and planning.

In the **Artist Programming Chip** a simple programming language is introduced which the children must use to copy given pictures. This problem not only relies on some knowledge of coordinates, but forces pupils to try it and see, a very valuable skill.

The **Binary Character Definer**, presided over by a rather depressed robot who's name I'll leave you to guess, sets the problem of copying patterns. This is done using binary numbers in exactly the way the BBC Micro character definer does. The patterns are assembled to make a flying craft which the players climb aboard and fly off in.

Once airborne the players have access to the main circuit board, they are given a number of chips to visit and a printed map to help them find their way about.

The **Boolean Logic Chip** contains a number of gates which follow the AND, EOR and NAND rules. The players have to find the correct bit pattern at the start of a short series of gates to create a given pattern at the other end.

The **Disc Control Chip** presents a sliding

James Clifford explores a fascinating new set of educational programs

THE MICRO BUGS

block puzzle that must be solved to complete a circuit. At this point they trap their first micro bug.

In the **Typesetting Rom** an empty page is presented. Into this need to go irregular shaped boxes containing text. The task is to first fit the boxes together so that they cover the page and then to get the correct text into the boxes.

Finally the pupils will arrive at the **Modem Communications Chip** where the other bug waits in a maze. Robots are used to chase the bug down a hole — the expression on its face at this point almost has you feeling sorry for it.

Having trapped the micro bugs the story ends by sending them via the modem to the North Pole. It then sends the players to some sun-drenched, presumably bug-free, island paradise.

At the end of each task the pupils are given a security code which can be used to jump them to that point in the game later on so it is possible to stop and re-start the adventure in a very flexible way.

Along with the storybook are nine pupils' reference cards and a teachers' book with full solutions and a hoard of ideas for extension work. The software is issued in a very useful form — there is a start-up disc which is protected but the rest of the program is on unprotected discs so effectively one copy of the package will run on as many machines as you like.

The package is able to use a concept keyboard and A3 and A4 overlays are provided.

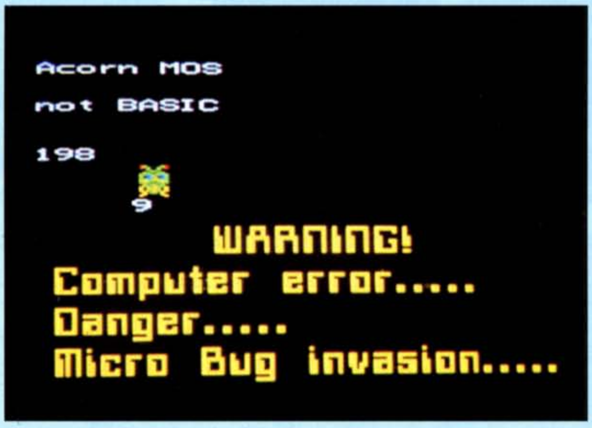
Three difficulty levels are available and the top one will tax most adults so this package can be used well up the secondary age range. Having said that, it may be that the package's style will make it difficult to present it to older students.

Another problem in the secondary school is that while Micro Bugs is IT based, only some of the problems use specific IT skills. In the junior school with an integrated/project based approach this is no problem, but in the secondary school this may cause timetabling troubles. However, the national curriculum constantly promotes Problem Solving Skills so secondary school would gain a lot from this package if they could slot it into the right place.

This is another excellent Sherston product which should draw the attention of secondary schools as well as primary. With the package available on 28 days approval, any interested teacher should give it a try. The Micro Bugs is also available for Econet and the Archimedes series.

Summing up

Micro Bugs is nicely presented and has a good way of breaking down comprehension difficulties. However the style limits it to primary schools and only some of the problems use specific IT skills.



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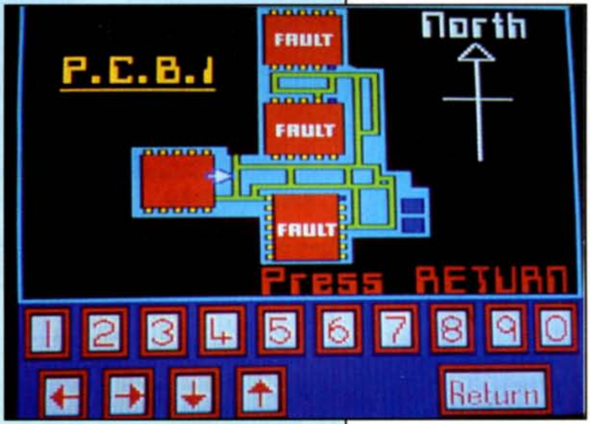
Acorn MOS

not BASIC

198

9
        WARNING!
Computer error.....
Danger.....
Micro Bug invasion.....
```

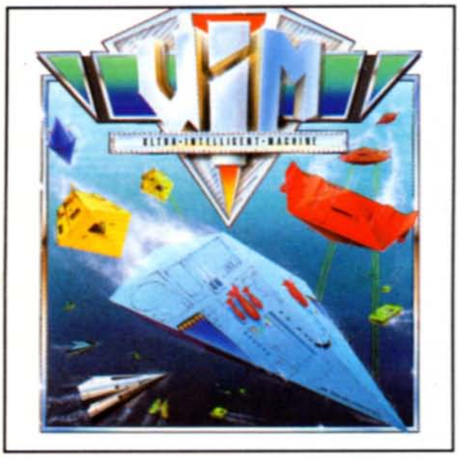
Don't panic – it's only a simulation!



Arcade-adventure fault-finding missions

ARCHIMEDES
BBC MICRO
ELECTRON

THE 4TH



U.I.M.

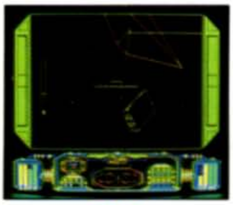
U.I.M. is a massive 3D arcade adventure set in the future. 2 1/2 years of dedicated design and programming have produced this massive game. The "greenhouse" gases melted the icecaps and all life now exists in the oceans. There are over 65000 underwater ports each with their own colonies.

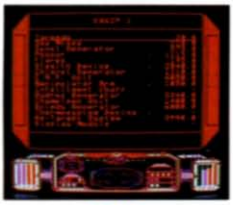
You must travel the oceans, trading in commodities, shares and currency. There are over 250 missions to complete before you will find your goal - the U.I.M. - created to be almost a god! Your craft is a highly manoeuvrable (and expandable) futuristic submarine named Black Satyr.

On your travels you will encounter many submarine types. Many of the most advanced and aggressive submarines do not appear until you reach later networks of ports. In addition you will also meet the Replicants - man-made underwater machines which have gone "renegade" and are capable of reproduction.

As you progress it is therefore essential to avail yourself of the highly sophisticated range of combat and defensive equipment available. The quest for the U.I.M. will be long and involved, the dangers intense, but the reward priceless!

U.I.M. is disc only and will run on BBC B or B+ with 16K of sideways RAM, BBC Master series and all Archimedes Computers.


BBC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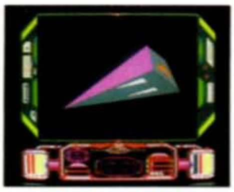
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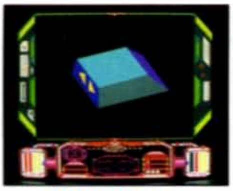
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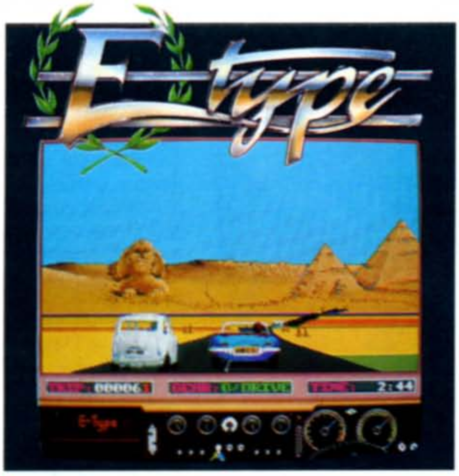

E-TYPE

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"E-Type" takes racing simulations into the world of 32 - bit RISC processing and gives you smoother, faster and more detailed graphics than you are even likely to see in the arcades.

If you're new to driving you can take the easy-to-drive automatic for a spin but experienced drivers can optimise their performance in the faster 5 speed manual "E-Type". There are hazards galore including other cars, roadworks, trees, rocks, bushes, billboards oilspills, etc. etc.

"E-Type" has been produced by the highly acclaimed and experienced Gordon Key who also produced the best-seller Holed Out.

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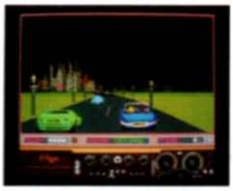
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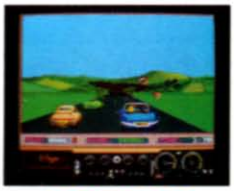
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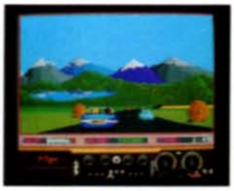
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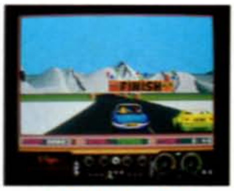

ARCHIMEDES

White
LEPRECHAUN
TITAN
IN THE
(C) The

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White Magic is a unique arcade adventure in which you control 4 varied adventures:-

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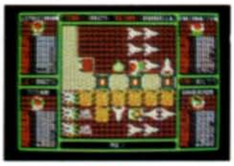
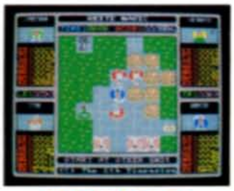
You can transform between all 4 characters at will and use their much needed special abilities.

It features 32 massive action-packed levels filled with aggressive guards and trolls, haunting ghosts and spectres, curious objects to find and use, and much more .....

White Magic is not a game for the faint-hearted; it is a fast-action game which requires fierce hand - to - hand combat and frantic weapon fire.


BBC


ARCHIMEDES

PRICES AND AVAILABILITY	ARCHIMEDES 31/2" DISC	BBC B/MASTER 51/4" DISC	BBC AND ELECTRON CASSETTE	MASTER COMPACT 31/2" DISC
U.I.M.	29.95*	19.95	-	21.95
E-Type	19.95	-	-	-
E-Type Designer	16.95	-	-	-
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Holed Out Extra Courses 1	16.95	11.95	9.95	12.95
Holed Out Extra Courses 2	16.95	11.95	9.95	12.95
Holed Out Designer	19.95	-	-	-
Arcade Soccer	19.95	12.95	9.95	13.95

*The Olympics and U.I.M. Archimedes versions due for release 5th December, 1989.

The Fourth Dimension

DIMENSION

ARCHIMEDES
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Magic
MAGIC
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Dimension

WHITE MAGIC 2

This includes 32 brand new and highly dangerous levels plus a complete level designer.

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An extra invisible feature in White Magic 2 will really confuse our adventurers!

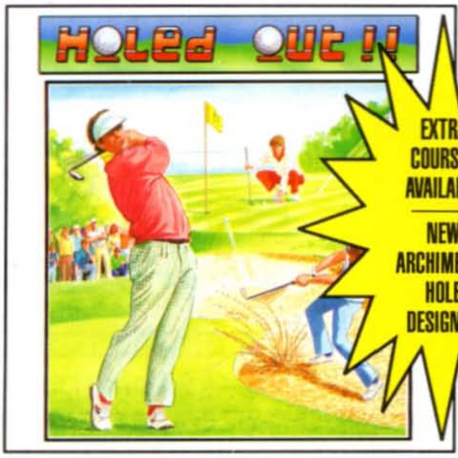
Reviews of White Magic

"The graphics are superb .... An absolute winner"
Electron User Golden Game August '89.

"Playability is good and I had to tear myself away in order to write this update review."
Archie review - The Micro User, October 1989.

ELECTRON

ARCHIMEDES



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Archive, June 1989

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BBC Acorn User, June 1989

"The 3D perspective graphics are stunning". *Electron User GOLDEN GAME June 1989*

"Holed Out is great ..... The game plays very well and the graphics are superb".
Popular Computing Weekly, March 1989

"The Electron version is brilliant - it's almost the same as playing at Gleneagles. Unreservedly recommended". *A & B Computing Game of the Month, June 1989*

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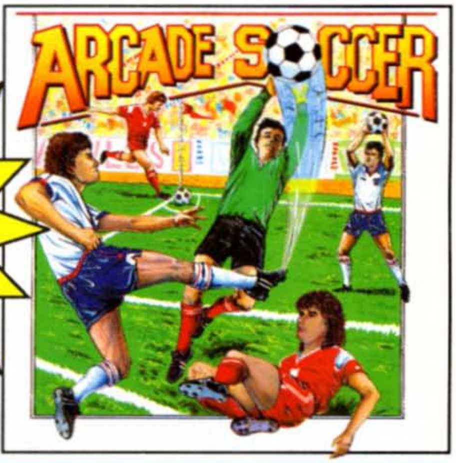
BBC

ELECTRON

ARCHIMEDES

ARCHIMEDES



ARCADE SOCCER

Arcade Soccer really is football action at its very best.

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"The game is very playable and you do get a feeling of involvement as you knock the ball into the corner of the net straight past the diving goalie. It's definitely one to play again, and if you've enough friends it could make for a good day of enjoyment - and not a lot of games can do that. Value for money ... 10 out of 10".
The Micro User, October '89.

ARCADE SOCCER
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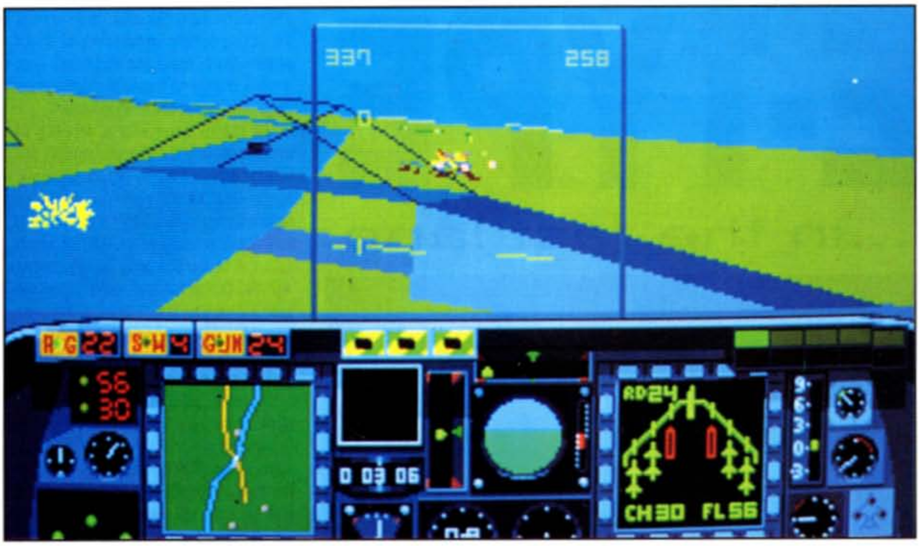


INTERDICTOR

...out of the blue

Price: £34.95
Supplier: Clares Micro Supplies, 98 Middlewich Road, Northwich Cheshire CW9 7DA.
Tel: 0606 48511
Requirements: Archimedes series with at least 1Mb of memory and either Risc OS or Arthur operating system. Fully compatible with the A3000.

IN Interdictor, the first flight simulator for the Archimedes, you are put at the controls of a new fly-by-wire fighter plane based at the edge of hostile territory. Your mission is to push the enemy away from a nearby river valley by taking over its airfields one by one and eventually blasting its headquarters.

In order to take an airfield successfully all its defences must first be destroyed. For example, you have to demolish any nearby bridges so supply trucks can't cross the river and then watch for ships moving up river with equipment to repair them. When an airfield has been taken you can save the game on to a formatted disc at the press of a key.

All the time surface-to-air missiles and enemy fighter planes will be trying to shoot you out of the sky. The SAMs shouldn't fire at you providing you remain below 300 feet, but that's not as easy as it sounds. Alternatively you can drop fine metal strips – known as chaff – to distract enemy radar.

You also carry flares – useful as decoys when a heat-seeking missile is locked on to you. While the missile follows the flare you have a few seconds to get into a position to shoot the opponent's plane down.

When first hit by enemy fire you will probably loose your electrics – you then have to rely on mechanical flight aids – or hydraulics, which is the end of your undercarriage. A second hit is usually fatal.

At the beginning of the simulation your plane has a full tank of fuel, 250 shells for the 30mm cannon, 36 air-to-ground rockets and 6 heat-seeking missiles. When you land at an airfield you are automatically refuelled and rearmed.

All the usual cockpit instruments are shown in the bottom third of the screen. These include, among other things, an attitude indicator, altimeter, speed and fuel meters and warning lights.

The instrument panel can be removed from the screen to leave a full forward view at any time – useful for ground attacks – and you can also select forward and side views.

Speed and height are also shown on the head up display – HUD as it is widely known. This is projected on to the canopy so that you can see vital information without looking down to the instrument panel. It also shows pitch lines, which remain parallel with the ground at all times and therefore help you see how much bank you are in when you can't see the horizon.

The game is completely Risc OS compatible but takes over the whole screen. The disc can be backed up but before being cleared for take-off you must go through a security check which involves looking up two randomly chosen grid references from a colour chart at the back of the manual and telling the micro what colours are found at these positions.

The quality of graphics tends to vary throughout the game. The best in my opinion are used for enemy aircraft, which have been drawn very well and move around smoothly. When one is shot down there is a very realistic explosion and debris falls to the ground. In contrast the airfields all look exactly the same.

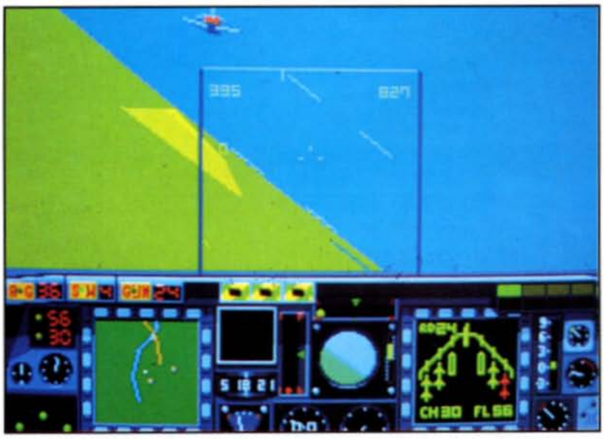
If the bangs and firing effects irritate rather than add excitement you can turn them off at the press of a key – alternatively you can switch off just the engine's drone while keeping all other effects.

Used in conjunction with the keyboard, the mouse gives perfect control and the plane reacts exactly as you would expect. The sensitivity can be altered and for beginners there is an auto-stabiliser option which makes flying easy and landing not entirely impossible.

The game was developed by a group of ex-British Aerospace employees and so, the packaging claims, is as near to the real thing as you can get. This program should appeal to shoot-'em-up, strategy and simulator addicts, although the price seems a little high.

Although I really enjoyed Interdictor I prefer the slower life, so hopefully it won't be too long before we see an airliner simulation on the Archimedes too.

John Butters



Dogfighting in the clear skies

Sound	*7*
Graphics	*9*
Playability	*10*
Value for money	*8*
Overall	*9*

VIEW II

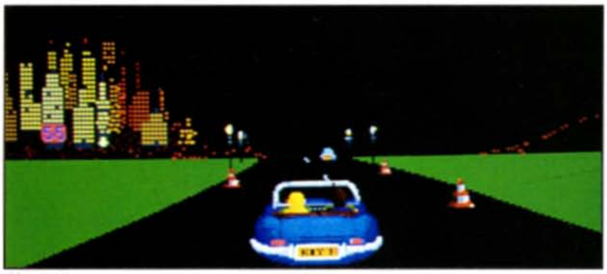
This simulation is a real shot in the arm – no pun intended – for a micro that's been crying out for decent games. I've never been too keen on flight simulators in the past because the lack of good graphics hasn't compensated for the difficulties of actually flying the thing. But Interdictor has changed that completely: The feeling of motion is enough to make you airsick – and I'm sure I would have blacked out on some turns. The realism is stunning. I've only managed to make it to the second airfield so far and those trucks keep coming along and re-supplying it. But I'm going to keep trying.

Lazarus

Price: £19.95
Supplier: The Fourth Dimension, P.O. Box 4444, Sheffield
Tel: (0742) 700661
Compatibility: Archimedes series and A3000, 1Mb ram minimum.

E-TYPE

...in the fast lane


Moonlighting

AT LAST, a game that begins to use the power of the 32 bit ARM processor. E-Type, as the name probably suggests, is a road racing game where you are at the controls of that beautiful machine: The Jaguar E-Type open top with V12 engine. I had the opportunity to drive a real one a few years back and the power of the game matches the real thing.

Double-clicking the game icon loads a beautiful 256 colour title screen while other parts of the program are loaded. Eventually you are prompted to insert the tracks disc and press the spacebar. The program then checks the new disc and moves to the game options screen.

Here you can alter the track to use, skill level and whether you're using a manual or automatic gearbox: An E-type automatic? Sacrilege. There's a mouse sensitivity option in three grades, sound volume and you can also enter your name. Finally click the play game icon to start.

You're presented with a view of the back end of your car with driver and passenger in the center of a road with fields and trees on either side. In the distance are a couple of snowcapped mountains and tree covered hills.

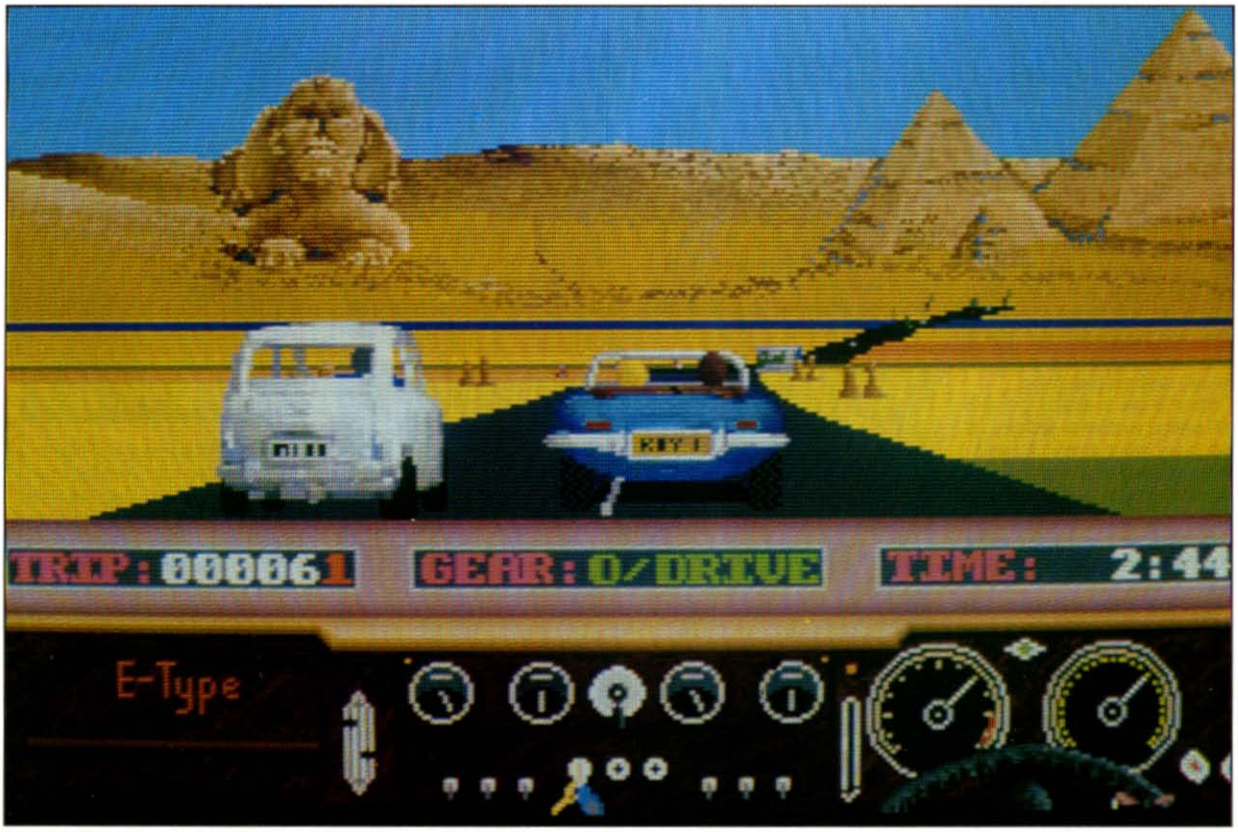
At the bottom of the screen is your console with glove compartment on the left, various oil pressure and temperature gauges – standard issue for an E-type – ignition keys, heater control, rev counter and speedometer; there's also a section of the steering wheel.

As you sit there other cars rush past you, several Minis, a couple of Porsches, a Lotus Esprit and, I think, an Alfa Romeo. Obviously you want to race them so it's foot down on the clutch, into first, clutch in and hard on the accelerator – well, each of the mouse buttons corresponds to a foot pedal – clutch, brake and accelerator – up arrow is change up a gear and down arrow for go down – you can change these.

So you're away with a screech of wheels. Moving the mouse controls the steering and your hands appear on screen as you steer left and right. You change up rapidly through the gears – racing past a long line of warning cones – hitting fourth gear just as the first bend appears, along with two policemen and some roadworks which force you and the rest of the cars over to the right-hand side.

It's here you'll most likely come a cropper – or copper – first. You'll either come to a staggering halt by hitting the roadworks, at which point you and your passenger will fly into the air only to land back in your seats. Or you'll hit another car. The bump results in a dramatic loss of speed which, if you're unlucky, will mean that you are hit by the car behind with the loss of yet more speed. So it's a fast change down in gears, then build up speed again.

If you hit the policemen they let out a pitiful cry and disappear. Past the first hurdle you shoot off down hill overtaking the cars that are now mostly on the right after the chicane. However the next barrier is some oil – or water – on the road. Hit it and you're all over the road for the next couple of hundred yards. It's all right here but



there's a later one that's guaranteed to be fatal if you hit it at more than 150mph.

And so it goes on there are time bonuses for each lap – about three miles each on my preview copy, but due to be much longer in the final version – so you just keep going round faster and faster trying to make the next lap before the time bonus runs out.

You and your car can take a certain number of bumps and knocks before becoming completely defunct – an event signalled by the driver and passenger slipping down out of sight and the back bumper falling off with an effective clang. A trip computer display gives elapsed time, distance covered, average speed, skill level and adjusted score. My fastest to date has been 196mph average.

I can't comment on the documentation as I didn't get any with my version but the final disc will come with several tracks, each with different scenery. The samples on my disc included the Lakes (which seems complete), the Broads, Antarctica, Egypt and Moonlighting, which composes a night time drive in the country near an American metropolis.

The author of this excellent product is Gordon Key, who's last product was Holed Out and before that Clogger. He's currently working on a E-Type track designer which should be available as you read this.

There are lots more things in E-Type that I haven't mentioned because it's more fun to find out for yourself, but there's just one word to describe E-Type: Fantastic.

Lazarus

Sound	*8*
Graphics	*10*
Playability	*9*
Value for money	*10*
Overall	*9*

VIEW II

This game is obviously seen as the Archimedes answer to arcade games like Out-run. It certainly has the visual effects and although I've never driven at 200mph I can well believe this is what it's like – on the straight.

However even an E-Type would have trouble cornering at that speed and in E-Type the best policy is just to put your foot down and keep it there, putting up with those bumps that do occur. The feeling of speed is superb, but I'm sure a real policeman would say more than "ouch!" if you ran him over. And I really enjoyed running down those rows of cones without any apparent penalty.

As a simple car racing game it's certainly fun but it isn't a simulation – and as a competitor to Out-run? There's no music.

Geoff Brown

LICENSED TO KILL

...Bond is back

Price: £14.99 (disc) £12.99 (tape)
Supplier: Domark, Ferry House, 51-57 Lacey Road, Putney, London SW15 1PR.
Tel: 01-780 2222

AS Timothy Dalton hangs up his Beretta for another year and Batman replaces Licence to Kill as THE film to see, the Domark programming machine finally gives a cough and a splutter and deposits yet another game of the film on to the market.

Domark has excelled with the packaging – a video-sized plastic box is adorned with photos of hunky Mr Dalton and some cracking screen shots from the game.

Unfortunately the company omit to state that the very impressive full-colour pictures are taken from the 16 bit version and not the measly two-colour BBC Micro program – a minor oversight, I'm sure.

Divided into three scenes, each having several sub-sections, the game follows Bond's epic battle with evil drugs baron Sanchez.

Bond's success or failure lies in your hands. Personally I'd let Sanchez go about his business and take up crochet work instead ... it's more exciting.

The action takes place in a diminutive portion of a two-colour display and, apart from the sound of your own gun, several sections of the game are played in complete silence.

Part one of scene one sees Bond and Leiter in a high speed helicopter chase with the fleeing Sanchez and his girlfriend. By peppering Sanchez's car with bullets you can force him to stop. Just watch out for the tall buildings and gun emplacements as you zip through Cray Cay.

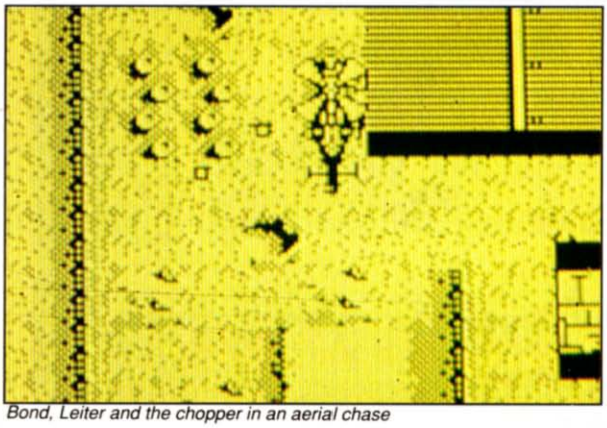
Having blocked Sanchez's escape you continue the chase on foot. Reminiscent of the arcade game Commando, you control Bond from above as he guns down the henchmen while running through a built-up area.

One annoying aspect is the way the enemy's bullets bend towards you as you step out of their original flight path – this appears to be linked to the screen scrolling.

You are advised to conserve your ammunition since you set out with a finite number of clips for your pistol. Additional ones may be dropped by deceased bad guys, but unless you are very careful you will still find yourself sprinting the last few hundred metres with an empty pistol in your hand.

In the final part of scene one Mr Bond and partner are following Sanchez's plane using a helicopter. With Bond swinging from a rope you must manoeuvre him into position above the tail of the plane and, using split second timing, press Fire and attach a tow rope to the decidedly uncooperative aircraft.

Moving on to scene number two we find Mr Bond in up to his neck in drug smugglers. James interrupts a drugs drop in Miami Bay and finds himself the target of the irate smugglers' anger.


Bond, Leiter and the chopper in an aerial chase

Swimming for his life he is pursued – and often run down – by rubber dinghies. Apparently James is armed with a knife with which to puncture the enemy divers and destroy the packets of drugs that fall from Sanchez's boat.

I couldn't seem to get him to do very much apart from die, but still I'm sure it will be all right on the night.

Due to my inability to complete the swimming event I failed to reach the second part of scene two where Bond tries his hand at water skiing behind a seaplane. Not to be outdone, I used a Hac man-type trick to reach the third and final scene.

With his drugs factory in ruins, Sanchez makes a dash for the border, his stock of drugs stashed in a fleet of 18 wheel tankers.

In a high-speed chase sequence you must destroy the tankers without falling foul of the Sanchez's Stinger missiles. Upon destroying the last – the one with Sanchez aboard – the game repeats itself, but with an increased level of difficulty.

I don't know whether it was because my copy was a pre-production version or not, but the absence of a pause button was a real nuisance.

There is no delay between the various sections, so unless you have thoroughly read and remembered the instructions you can find yourself being launched into the next scene without a clue as to what you are supposed to be doing.

I was most disappointed with Licence to Kill. This is a prime example of a glossy film title being used to market a second rate game.

I may have been more charitable had the game been priced at around the £2.99 mark, but at £14.99 for the disc version it is daylight robbery.

Jon Revis

Sound	*4*
Graphics	*5*
Playability	*5*
Value for money	*5*
Overall	*5*

VIEW II

I've never been too happy about games of films and this one was completely new to me as I haven't seen the film either. However I was quite pleasantly surprised.

It's true that the play area is very small – about two inches square – and it's only two colour, but the graphics are drawn to a high standard and the size of the overall game is huge.

I really enjoyed swooping down in the helicopter and blowing the ground defences to bits. The swerving bullets were a bit unnerving but I found the overall gameplay very acceptable and I've enjoyed playing this again and again.

Lazarus

SUPERIOR SOCCER

...another kick in the grass ?

Price: £11.95 (disc) £9.95 (tape)
Supplier: Superior Software, 3 Manor Drive, Scawby, Brigg, South Humberside DN20 9AX.
Tel: 0652 58585

IN the past football programs have tended to concentrate upon playing the game or managing it. With the advent of Superior Soccer you can do both.

Once you have specified whether or not you will be playing alone or with a friend, your next job is to decide which sections you intend to play.

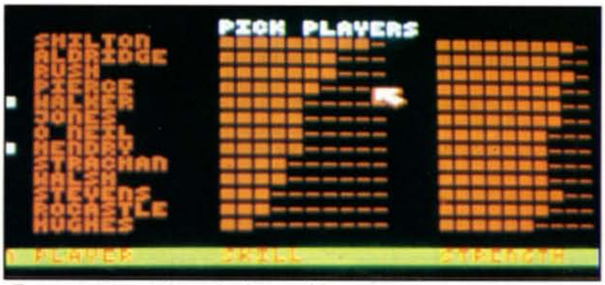
Realising that you may not always have a full evening free, Superior allows you to play either the arcade or the management part in isolation.

The arcade game provides a comprehensive list of options. The 10 skill levels determine the ability of the opposition in the one-player game or the skill of both goalkeepers when using the two-player option.

Other niceties allow you to specify the duration of a match or change the colours of the teams' shirts.

Superior Soccer does not support a joystick option so you and your opponent must each select a set of keys with which to control your respective teams.

You control only one player at a time and he is identified by arrows. The program determines which player you control by always selecting the one nearest the ball when you relinquish control of the current one. This feature can be over-ridden to some degree by keeping a man moving once he has been chosen.



Team management can give hours of fun

Players can perform a whole range of footballing type antics, such as passing, tackling, heading and throwing – providing that you can master the controls, that is.

The instructions mention that some of the activities require a great deal of practice before you can execute them fluently. They are not kidding: I must have made 20 abortive attempts to pass the ball before I eventually succeeded.

The best way to practise your ball skills is to select the two-player option and then play alone – your chances of winning are also improved slightly.

Superior Soccer's graphics are very good. A large central window follows the movement of the ball as it is booted around the pitch by the Gauntlet-style players.

Player movement off the ball and your position in relation to the whole pitch can be monitored by glancing at the Pitch Scanner.

This small green rectangle is a map of the pitch on which both teams and the ball are represented by different coloured dots – not that you will find much time to look at it.

One of the game's fun features is the cartoon commentator who issues forth a constant stream of David Colemanisms, but only in speech bubbles.

If you begin to find the arcade action a little too hectic you can always sit back and play at being the boss.

Starting in any of the four divisions you must fight your way into one of the top two positions in order to achieve promotion.

Your best bet is to gain some experience, and money by spending a couple of seasons in division four before making a concerted effort for the big time.

Your first task as manager is to survey your squad and assess which players are at peak fitness – this can be deduced by observing their skill and strength ratings.

When playing the management game alone, you just sit and wait for the match results to be displayed on the screen.

Following a brief look at the league table you can nip down to the transfer market. Here you can offer one of your down-and-outs for sale and hope that some mug will bid a million.

As you reach the end of the season you may just about be able to afford to buy a new striker. if one is available. The program determines what calibre of player is to be sold and at what price.

If either of these factors do not meet your requirements then that's too bad, because there won't be another sale until after next week's game.

The secret of good management is to monitor the skill and strength values of each team member closely. If each player is not rested at regular intervals the performance of the whole team can suffer dramatically.

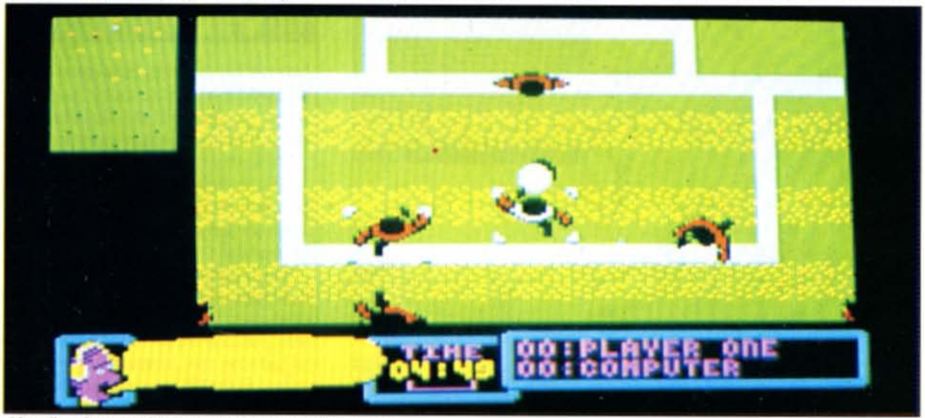
If you have a spare evening at your disposal you can take a shot at both managing and playing. But with 11 games per season this may prove a little taxing for all but the most ardent of football fanatics.

By combining both the arcade and management routines into one composite program Superior has given the punter the best of all worlds.

No longer can the relegated manager blame lady luck for his downfall. By stepping out on to the pitch with his lads he has nobody to blame but himself.

Jon Revis

Sound	*6*
Graphics	*8*
Playability	*8*
Value for money	*9*
Overall	*8*



Heading for goal in the tactical part of the game

VIEW II

First it was golf and now it's soccer, here we go... Not being an arcade game fan I only took a passing glance at the "tactical" part of the game – the David Coleman-clone was mildly amusing but his comments were limited and continued even when there was no action on the pitch. The managing section was very simple to use but definitely fun – it kept my attention quite thoroughly for several hours. And I'd recommend it for a quiet evenings entertainment.

Steve Turnbull

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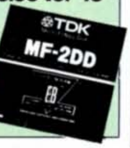

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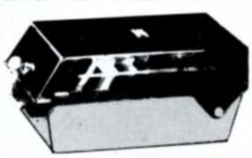

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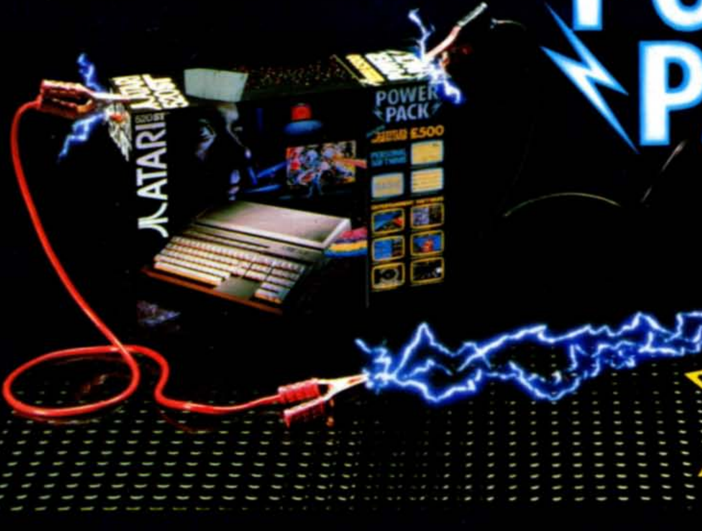
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On the right track

Locate files easily with Stuart Tyrell's clever utility

ONE of the major advantages of Acorn's ADFS is that it has a tree structure – files may be placed in different sections of the disc (directories) and these may themselves be split up into smaller ones, and so on. A disadvantage here is that it is easy to forget where in the tree you have placed a file and then you have to search through trying to find it.

This is not unlike searching an oak tree for a particular leaf while only being able to see the branch you are standing on – and it may take as long. However, help for the woodsman comes with this program which creates a relocatable module to help you find lost files. First type it in, ensure you've made no typing errors using the checksums, and save it.

When you enter RUN it saves a module called *FileFind*. To use it enter:

```
*RMLOAD FileFind
```

or:

```
*FileFind
```

or double-click on the file from the Desktop.

The module adds a new star command to the Archimedes:

```
*Find <filename> [start directory]
```

Entering it will produce a list of files and directories which match the filename given using the start directory, and its sub-divisions if it's included. The start directory is optional and if it is not entered the search covers the current one.

The filename may contain wild cards: # stands for any single character and * for any number of them. The start directory follows the standard convention – *:0* will select drive 0. For example:

```
*Find  !ReadMe  :App1
```

will list any !ReadMe files on the disc *App1*.

```
*Find !ReadMe
```

locates any !ReadMe files in the current directory.

```
*Find  spr*  :0.Fred
```

finds any filenames beginning with *spr* within *Fred* on drive 0 and:

```
*Find  spr#  :0.Fred
```

will list any four letter filenames beginning with *spr* in *Fred* on drive 0. You can list every file on a disc with:

```
*Find  *  :<Drive Number>
```

Due to the uniformity of all the ADFS, Net and Ram filing systems, you can use the command with these too — just prefix the catalogue with the filing system name. So to list all the application files on your ram disc just perform:

```
*Find  !*          ram:$
```

● *So there you have it — the ability to use the ADFS structure to its full potential without having to worry about searching through directories and sub-directories for misplaced files.*

!FindFile application

Free to subscribers on the 3.5in monthly disc for this issue is a complete multi-tasking Risc OS application that uses this module to make finding files even easier.

If you don't have a subscription you can obtain a copy of the program by sending a £2 cheque or postal order and a ready-formatted blank 3.5in Archimedes disc to Stuart Tyrell, 2 Woodside Avenue, Moss Bank, St Helens, Merseyside WA11 7BS.

```
   10 REM >FFindSRC
   20 REM by Stuart Tyrrell
   30 REM (c) The Micro User
   40 MODE0
   50 PROCmc
   60 PROCsave
   70 END
   80 :
   90 DEFPROCmc
  100 DIM MC% 1023
  110 Help$="File Finder"+CHR$9+"
1.00 ("+MID$(TIME$,5,11)+")"
  120 SearchB=11
  130 ReturnB=10
  140 DirP=9
  150 DirB=8
  160 WorkS=12
  170 OK=7
```

Turn to Page 40 ▶

All program listings in this issue can be downloaded FREE on . . .

MicroLink

◀ From Page 39

```
180 NoLeft=6
190 FOR pass=4 TO 7 STEP 3
200 P%=0:O%=MC%
210 [OPT pass
220    DCD 0
230    DCD getspace
240    DCD 0
250    DCD 0
260    DCD title
270    DCD help
280    DCD command
290 .title
300    FNs("FileFinder")
310 .help
320    FNs(Help$)
330 .getspace
340    STMFD R13!,{R14}
350    MOV R0,#6
360    MOV R3,#&5000
370    SWI "OS_Module"
380    STR R2,[R12]
390    LDMFD R13!,{PC}
400 .command
410    FNs("Find")
420    DCD findentry
430    DCD &20301
440    DCD syntax
450    DCD findhelp
460    FNs("FindAuthor")
470    DCD 0
480    DCD 0
490    DCD 0
500    DCD authorhelp
510    DCB 0
520 .syntax
530    FNs("Syntax: *Find <filename> [
start directory]")
540 .findhelp
550    FNs("*Find <filename> [start di
rectory] displays a list of where <filen
ame> may be found in relation to the CSD
, or [start directory] if this is given.
")
560 .authorhelp
570    FNs("FileFinder was written by
S.Tyrrell for The Micro User.")
580 .findentry
590    STR R14,exit
600    LDR WorkS,[WorkS]
610    MOV SearchB,WorkS
620    ADD ReturnB,WorkS,#&100
630    ADD DirB,WorkS,#&200
640    MOV DirP,DirB
650 .copyall
660    MOV R4,SearchB
670    .copysearch
680       LDRB R3,[R0],#1
690       CMP R3,#32
700       MOVLE R3,#0
710       STRB R3,[R4],#1
720    BGT copysearch
730    CMP R1,#1
740    MOVEQ R3,#ASC("@")
750    STREQB R3,[DirP],#1
760    .copydir
770       LDRB R3,[R0],#1
780       CMP R3,#32
790       MOVLE R3,#0
800       STRB R3,[DirP],#1
810    BGT copydir
820 .starthere
830    STMFD R13!,{R0-R6,R14}
840    MOV R4,#0
850    .loop
860       STMFD R13!,{R4}
870       MOV R0,#10
880       MOV R1,DirB
890       MOV R2,ReturnB
900       MOV R3,#1
910       MOV R5,#&100
920       MOV R6,SearchB
930       SWI "OS_GBPB"
940       LDMFD R13!,{R4}
950       STR R3,OK
960       MOV R0,#10
970       MOV R1,DirB
980       MOV R2,ReturnB
990       MOV R3,#1
1000      MOV R5,#&100
1010      ADR R6,star
1020      SWI "OS_GBPB"
1030      MOV NoLeft,R4
1040      CMP R3,#0
1050      BEQ skip
1060      LDR R0,OK:CMP R0,#0
1070      MOVNE R0,DirB
1080      SWINE "OS_Write0"
1090      SWINE &100+ASC(".")
1100   ADDNE R0,ReturnB,#&14
1110   SWINE "OS_Write0"
1120   SWINE "OS_NewLine"
1130   LDR R0,[ReturnB,#&10]
1140   CMP R0,#2
1150   BNE skip
1160     MOV R1,#ASC(".")
1170     STRB R1,[DirP,#-1]
1180     ADD R1,ReturnB,#&14
1190     .adddir
1200       LDRB R3,[R1],#1
1210       CMP R3,#32
1220       MOVLE R3,#0
1230       STRB R3,[DirP],#1
1240     BGT adddir
1250     BL starthere
1260     :
1270     .deldir
1280       LDRB R3,[DirP,#-1]!
1290       CMP R3,#ASC(".")
1300     BNE deldir
1310     MOV R3,#0
1320     STRB R3,[DirP],#1
1330    .skip
1340    CMP NoLeft,#0
1350  BGE loop
1360 LDMFD R13!,{R0-R6,PC}
1370 LDR R15,exit
1380 .star
1390    FNs("*")
1400 .OK
1410    DCD 0
1420 .exit
1430    DCD 0
1440 ]:NEXT
1450 ENDPROC
1460 :
1470 DEFFNs(Text$)
1480 [OPT pass
1490 EQUS Text$
1500 DCB 0
1510 ALIGN
1520 ]:=0
1530 :
1540 DEFPROCsave
1550 SYS "OS_File",10,"FileFind",&FFA,,
MC%,O%
1560 PRINT'"Module Saved as ""FileFind"
""
1570 ENDPROC
```

Get it right!

```
10 =    0 0
20 =    0 0
30 =    0 0
40 = FA1B B
50 = AC81 B
60 = 90DB D
70 = FD2E 7
80 = 9719 3
90 = 3D04 6
100 = BDE8 D
110 = 5A08 3
120 = 689C 7
130 = E917 4
140 = F871 D
150 = C553 1
160 = 47D6 5
170 = 6253 B
180 = 5595 8
190 = 1BA2 E
200 = 4E80 E
210 = 4E48 8
220 = 9CF6 7
230 = 2848 D
240 = 9CF6 1
250 = 9CF6 0
260 = 9C18 1
270 =  48C C
280 = 6F34 A
290 = FD02 B
300 = 4305 8
310 = 5B46 4
320 = EDDB 5
330 = 68AB 7
340 = ED3D F
350 = DB9D 8
360 = 2694 6
370 = A0E4 0
380 =  839 B
390 = E737 3
400 = E454 B
410 = A289 8
420 = 4144 F
430 = 5986 0
440 = 3CBB F
450 = D2F6 8
460 = ABA2 9
470 = 9CF6 3
480 = 9CF6 6
490 = 9CF6 8
500 =  156 2
510 = 2E56 1
520 = 5A3C 4
530 = DC3D F
540 = 9215 E
550 = 2B29 7
560 = C1D7 5
570 = 3992 9
580 = EA80 7
590 = 24D9 D
600 = B3E9 7
610 = 4E15 3
620 = 95B0 4
630 = 5B4A E
640 = A1D2 4
650 = F748 E
660 = B650 2
670 = E726 4
680 = E056 5
690 = 9F78 8
700 = 1BB0 A
710 = BEFF 5
720 = 1E3D D
730 = 803A 8
740 = AC23 A
750 = 6E6B 8
760 = 10B2 8
770 = E056 A
780 = 9F78 E
790 = 1BB0 F
800 = 6C6C C
810 = 94ED C
820 = 9692 A
830 = AE31 2
840 = 71AA A
850 =  325 9
860 = CF36 8
870 = 48D2 6
880 = A2D4 C
890 = FC6C 3
900 = 30A6 D
910 = 5881 9
920 = 7037 2
930 = 6B86 F
940 = 1899 0
950 = AB68 E
960 = 48D2 4
970 = A2D4 4
980 = FC6C 2
990 = 30A6 B
1000 = 5881 B
1010 = E2B2 5
1020 = 6B86 1
1030 = 5CCC C
1040 = 7D73 4
1050 = 9DAB D
1060 = CDB2 D
1070 = A625 6
1080 = E481 D
1090 = 1C26 9
1100 = 3B51 4
1110 = E481 F
1120 = 784A D
1130 =  390 3
1140 = C6ED 9
1150 = CAA1 9
1160 = F318 E
1170 = 34A0 E
1180 = 62DF 1
1190 = EDF3 A
1200 = 4A07 9
1210 = 9F78 2
1220 = 1BB0 F
1230 = 6C6C C
1240 = 5990 C
1250 = C3D0 A
1260 = 9719 3
1270 = 8160 D
1280 =   D1 9
1290 = 548B E
1300 = 8DB8 9
1310 = 2087 4
1320 = 6C6C 6
1330 = BA0A 8
1340 = 540F F
1350 = 5842 F
1360 = 9762 5
1370 = 10F7 0
1380 = 7CB3 E
1390 = CBC2 0
1400 = 799A 8
1410 = 9CF6 E
1420 = DC83 6
1430 = 9CF6 B
1440 = DA42 E
1450 = ED0F 2
1460 = 9719 4
1470 = 7BA9 0
1480 = 4E48 9
1490 = 7BD8 E
1500 = 2E56 0
1510 = 24FA E
1520 =  B43 8
1530 = 9719 6
1540 = 7A2C E
1550 = D038 F
1560 = 8431 4
1570 = ED0F 6
```

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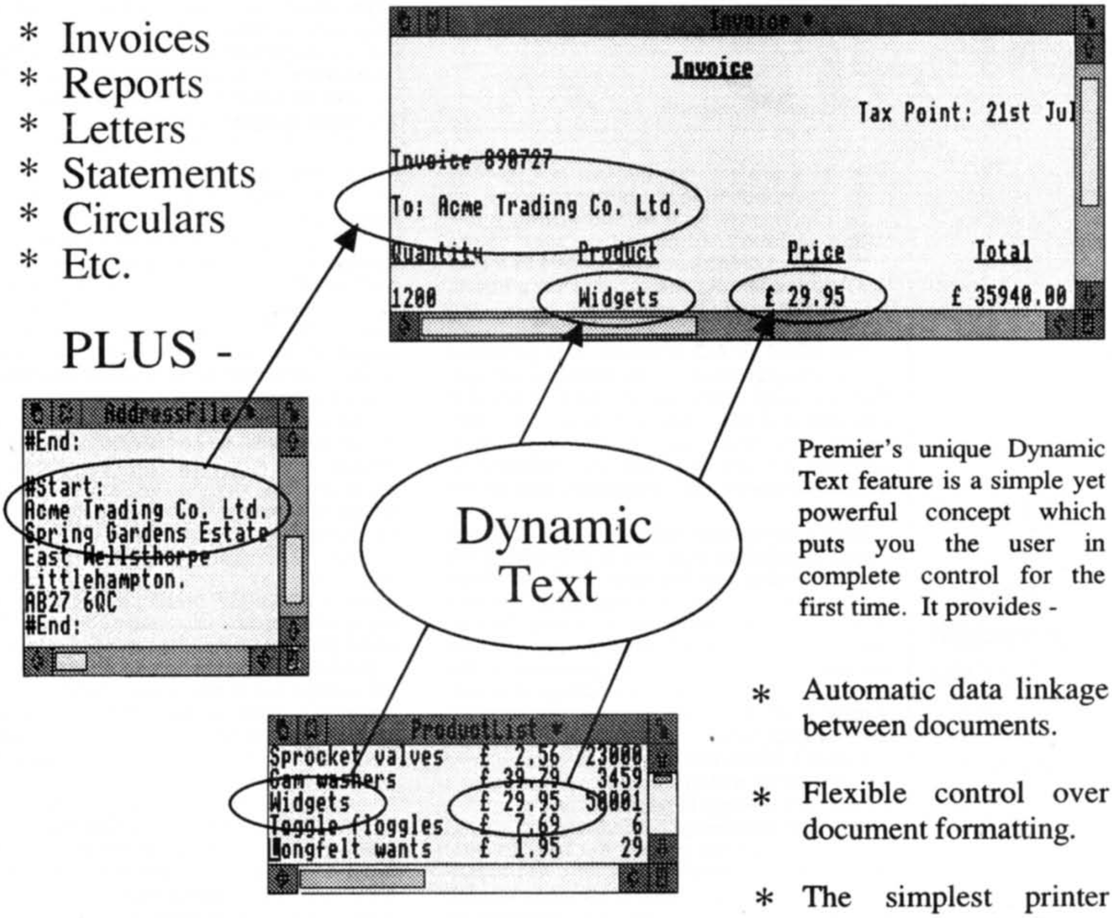

```
Invoice

                                Tax Point: 21st Jul
Invoice 890727
To: Acme Trading Co. Ltd.
Quantity      Product       Price        Total
1200          Widgets       £ 29.95      £ 35940.00
```

```
#End:

#Start:
Acme Trading Co. Ltd.
Spring Gardens Estate
East Wellsthorpe
Littlehampton.
AB27 6QC
#End:
```

```
Sprocket valves    £  2.56  23000
Cam washers        £ 39.79   3459
Widgets            £ 29.95  50001
Toggle floggles    £  7.69      6
Longfelt wants     £  1.95     29
```

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Conversion capers

The Body Build Experimenter's Board was first described in the August 1988 issue of The Micro User *and a comprehensive range of experiments to perform with it were described in the following nine issues. It enables you to learn about interfacing in a relatively painless way and contains many components which can be interlinked to enable a wide variety of experiments to be performed. Now we continue with our exploration, this time with a look at analogue to digital conversion.*

Mike Cook reveals the A/D conversion facilities of the Experimenter's Board

THE projects for the last few months have been fun but rather frivolous, so let's now look at something more serious. Although I've been asked why I didn't put an analogue to digital (A/D) converter on the Experimenter's Board, I did in fact put in three different types – but all in disguise.

The job of an A/D converter is to provide a digital representation for an analogue voltage. Perhaps surprisingly, at the heart of any A/D converter is a D/A – Digital to Analogue – converter, and the Experimenter's Board is equipped with one. The other vital ingredient for an A/D converter is a comparator, also on the board.

Now a comparator will accept two analogue voltages, called an input and a reference. If the former is higher than the latter it outputs a logic one, otherwise it outputs a logic zero. The trick in making an A/D converter is to feed the voltage we want to convert into the input and feed the reference input from a D/A converter. In this way the micro can tell if the voltage it is outputting on the D/A is greater or smaller than the unknown input one.

Figure I shows this arrangement and how to achieve it by wiring up the Experimenter's Board. Link 1 needs to be broken to prevent the relays from chattering, but make link 4 so you can see the number going to the D/A converter on the LED bar display. Note for these experiments that you will need a variable voltage source, which can be achieved conveniently by using a potentiometer – any value from 10K to 1M. If it is wired across the reference of the D/A measurable voltages will be produced over the whole range of its travel. The trick in producing an A/D converter is to get the micro to match the input voltage.

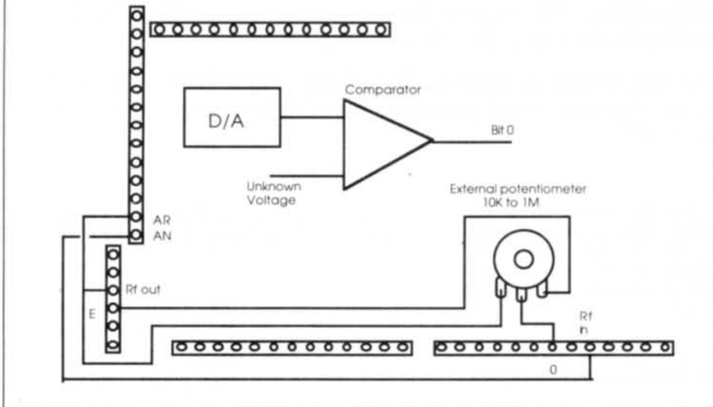

Figure I: Wiring up the Experimenter's Board

There are various strategies for doing so but perhaps the simplest is called the single ramp method. This is where the micro outputs the smallest voltage it can from the D/A and if it is smaller than the input voltage the comparator output will be zero. If this is the case the D/A output is increased by the smallest possible step – called a quantum step.

The comparator is then tested again and this is repeated until the comparator is tripped. The voltage input at that point is very close to that being produced by the D/A, and as the micro knows what number that is the same value must correspond to the input voltage.

This is known as the single ramp method because if you look at the voltage being produced from the D/A on an oscilloscope it looks like a ramp or saw tooth wave. The final height of the sawtooth is equal to the input voltage.

Note that the number produced is not equal to the voltage but is the nearest number that can describe it. What we have done is to describe the voltage in terms of the number of quantum steps taken to match it; we say we have quantised the voltage.

Any A/D conversion is only accurate to plus or minus one step and this is called the quantisation error. By the way, all these terms were around long before terms like quantum leap were incorrectly used to mean large. Quantum, in fact, means the smallest possible.

How can we achieve a single ramp conversion? We need some software, and examples are shown in Forth and Basic, but this method could also be easily implemented in machine code for faster results:

FORTH: Listing 1 shows two blocks of Forth but only block 8 is used for the single slope A/D. It also contains some words common to the other types of A/D and with these no other blocks need to be loaded.

Line 1 defines a word to print out a message along with the number on top of the stack. Line 2 will output the top of the stack to the D/A and line 3 will read the input bits and mask out all but bit 0. The next line just initialises the user port for input and output while line 5 begins the definition of the single slope method: It is in an infinite loop that needs Escape pressing to terminate it.

First of all -1 is placed on the stack then the BEGIN UNTIL structure increments the top number on the stack sends it out to the D/A and reads the comparator input. This only terminates when the comparator output is zero – when its reference input voltage, derived from the D/A, is larger than the input voltage or the D/A is producing the maximum voltage.

```
 SCR # 8       8 H
   0 ( A to D Converter ) HEX
   1 : PV ." Input Voltage is " . CR ;
   2 : VOUT FE61 C! ;
   3 : VIN FE60 C@ 1 AND ;
   4 : INIT FF FE63 C! 0 FE62 C! ;
   5 : SSLOPE BEGIN -1
   6 BEGIN 1 + DUP VOUT VIN 0 =
   7     OVER FF = OR UNTIL
   8          PV 0 UNTIL ;
   9
  10
  11
  12
  13
  14 INIT
  15 DECIMAL
 SCR # 9       9 H
   0 ( TRACKING A/D )
   1 : TRACK 128 BEGIN
   2     DUP VOUT VIN 1 = IF
   3 1 ELSE -1 THEN + DUP 256 = IF
   4 1 - THEN DUP -1 = IF 1 + THEN
   5   DUP PV 0 UNTIL ;
   6
   7 ( Sucessive approximation )
   8 : SUC BEGIN  128 0
   9  BEGIN OVER OVER OR VOUT VIN
  10 1 = IF OVER OR THEN SWAP 2/
  11  SWAP OVER 0 = UNTIL
  12     PV DROP 0 UNTIL ;
  13
  14
  15
```

Listing I

BASIC: Listing II shows a Basic version of a single ramp A/D conversion. It basically consists of a REPEAT .. UNTIL structure which outputs the variable *T%* to the D/A. Each time round the loop *T%* is incremented and the loop only terminates when the comparator output is zero – when the comparator's reference voltage, derived from the D/A ,is larger than the input voltage – or the D/A is producing the maximum voltage.

```
   10 MODE 7
   20 PRINT TAB(0,4);"Body Build Experim
enters Board"
   30 PRINT"A/D converter"
   40 PRINT"Single slope"
   50 PRINT"By Mike Cook"
   60 ?&FE62=0 : REM B side inputs
   70 ?&FE63=&FF : REM A side outputs
   80 REPEAT
   90 T%=-1
  100 REPEAT
  110 T%=T%+1
  120 ?&FE61=T%
  130 UNTIL (?&FE60 AND 1)=0 OR T%YY255
  140 PRINTTAB(0,12);"Input voltage valu
e is ";T%;SPC(3)
  150 UNTIL FALSE
```

Listing II

```
 10 = 1092 2  |  90 = C603 4
 20 = 2603 9  | 100 = BFBA 7
 30 = 24F8 D  | 110 = 5E5E 9
 40 = F035 F  | 120 = 6853 F
 50 = FC23 0  | 130 = 31F5 7
 60 = 901A A  | 140 = 27A3 8
 70 = 6C04 C  | 150 = 226C 8
 80 = BFBA 8  |
```

When you run these programs you will see the LED bar display continually changing. An important point to note is that the larger the voltage we are converting the longer it takes. You will see a much more rapid update with smaller numbers than larger ones. We say that the conversion time is dependent on the input voltage and this is because the D/A has to ramp up to the required voltage.

Another strategy is not to start the ramp at zero each time but to begin at the value you last read. Now, however, you will need to be able to ramp down as well as up. In effect what we do is to nudge the D/A one step up or down each time we sample the comparator. This produces what is known as a tracking A/D where the D/A output tracks or follows the voltage input. In this way an output value is always available, with no need to wait for any conversion time. Again we can implement a tracking A/D converter in either Basic or Forth:

FORTH: The tracking A/D is shown in the first six lines of block 9 in Listing I. Again it is in an endless loop terminated by Escape. We start with the mid range number on the stack – line 1 – and then make a copy and output it – line 2. Having read the comparator state we either increment or decrement the top of the stack in line 3.

Next we have to make sure that we do not get an over or under flow by testing the number, and if necessary bringing it into the range of 0 to 255. Line 5 duplicates the number and prints it out.

BASIC: Listing III shows a Basic version of the tracking algorithm. The variable *T%* is used to generate the A/D voltage – line 90 – and it is decremented or incremented depending on the state of the comparator output – line 100. Lines 110 and 120 make sure that *T%* always stays between 0 and 255 and its value is printed each time round the loop.

Note that the tracking method produces a number that is dithering by one least significant bit – it is first indicating the number corresponding to just greater than the input voltage and then the one corresponding to just less. In most applications this is not a disadvantage, and might possibly be useful – for example, it helps reduce quantisation noise in high quality audio sampling.

However there is a snag: The tracking method can't follow rapidly changing signals. If you move the potentiometer quickly you will see the indicated voltage ramp up to the new level which is known as slope overload and produces slope overload distortion. On the other hand this is the quickest way of getting a sample.

A compromise between speed of conversion and reducing slope overload can be made if you combine the two procedures. Instead of ramping up to a voltage you leap to it in a series of diminishing steps. In other words you guess at the

Turn to Page 44 ▶

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```
    10 MODE 7
    20 PRINT TAB(0,4);"Body Build Experim
enters Board"
    30 PRINT"Tracking A/D converter"
    40 PRINT"By Mike Cook"
    50 ?&FE62=0 : REM B side inputs
    60 ?&FE63=&FF : REM A side outputs
    70 T%=0
    80 REPEAT
    90 ?&FE61=T%
   100 IF (?&FE60 AND 1)=1 THEN T%=T%+1 E
LSE T%=T%-1
   110 IF T%=-1 THEN T%=0
   120 IF T%=256 THEN T%=255
   130 PRINTTAB(0,12);"Input voltage valu
e is ";T%;SPC(3)
   140 UNTIL FALSE
```

Listing III

```
 10 = 1092 2     80 = BFBA 2
 20 = 2603 9     90 = 6853 4
 30 =  3BA 8    100 = 6220 2
 40 = FC23 9    110 = 8B57 7
 50 = 901A D    120 = B967 C
 60 = 6C04 8    130 = 27A3 4
 70 = 9766 B    140 = 226C 6
```

◀ *From Page 43*

number, see if your guess was high or low and guess again. If you've ever played the game Hilo, you'll know that the best strategy is to always make your guess in the middle of the range.

Having found which half of the range contains your number you half it and this is repeated until you hit on the number. In the case of our D/A converter the range is 0 to 255 – 8 bits – so we can always get the number in 8 guesses.

The strategy therefore is simple, &80 is half the range – the top bit is set and all the others not. If that is too low we keep this set and try setting the next lower one and if that is too high we clear it and try the next. Although this may sound complex it is quite easy to implement:

FORTH: The successive approximation routine in Forth is shown in the last half of block 9 in Listing I. This is an example of Forth's write only nature. It was quite easy to write but looking at it, it appears quite complex.

Basically we have two numbers on the stack, the lower is the bit we are currently testing and the top is the accumulated guess so far. These are initialised to be 128 – &80 – and 0. Line 9 performs a logical OR to combine both the numbers and outputs the result. On reading the comparator if we need to keep that bit set we OR the top two numbers making sure that the lower one is preserved. Then this is shifted one place to the right and if the result is zero we have tested all the bits and the loop terminates.

BASIC: successive approximation routine is shown in Listing IV. The variable *T%* is the bit pattern we are testing and *A%* our accumulated guess. Line 90 and 100 initialise them with line 120 sending them to the D/A converter. Note that we perform a logical OR operation on the variables to combine them.

Line 130 tests the comparator output and permanently adds the test bit to our accumulated guess if the comparator shows we have not yet reached the input voltage level. Each time round the loop we change the bit we are testing by shifting *T%* one place to the right – line 140. When *T%* reaches zero we have tested all our bits and the answer is in the variable *A%*.

With the successive approximation method we only need to pass eight times round the loop for any voltage and so it is very fast. All the above methods can be implemented in hardware instead of software and that is what you get when you buy an A/D chip. Next month we will look at some practical uses for our A/D converter.

```
    10 MODE 7
    20 PRINT TAB(0,4);"Body Build Experim
enters Board"
    30 PRINT"Sucessive approximation"
    40 PRINT"A/D converter"
    50 PRINT"By Mike Cook"
    60 ?&FE62=0 : REM B side inputs
    70 ?&FE63=&FF : REM A side outputs
    80 REPEAT
    90 T%=&80
   100 A%=0
   110 REPEAT
   120 ?&FE61=T% OR A%
   130 IF (?&FE60 AND 1)=1 THEN A%=A% OR
T%
   140 T%=T% DIV 2
   150 UNTIL T%=0
   160 PRINTTAB(0,12);"Input voltage valu
e is ";A%;SPC(3)
   170 UNTIL FALSE
```

Listing IV

```
 10 = 1092 2    100 = 3084 D
 20 = 2603 9    110 = BFBA D
 30 = 80CD A    120 = 2697 F
 40 = 24F8 A    130 = 13C9 9
 50 = FC23 E    140 = 669C 8
 60 = 901A 2    150 = 402D 0
 70 = 6C04 A    160 = 697F 3
 80 = BFBA F    170 = 226C 1
 90 = C6B0 A
```

The experimenter's board is still available but unfortunately due to the increasing costs of components the price has been raised. Nevertheless it still represents excellent value – see the accompanying order form. Have a Merry Christmas – I'll see you next year.

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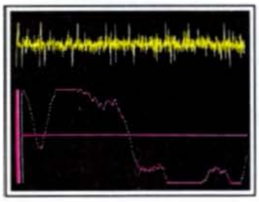

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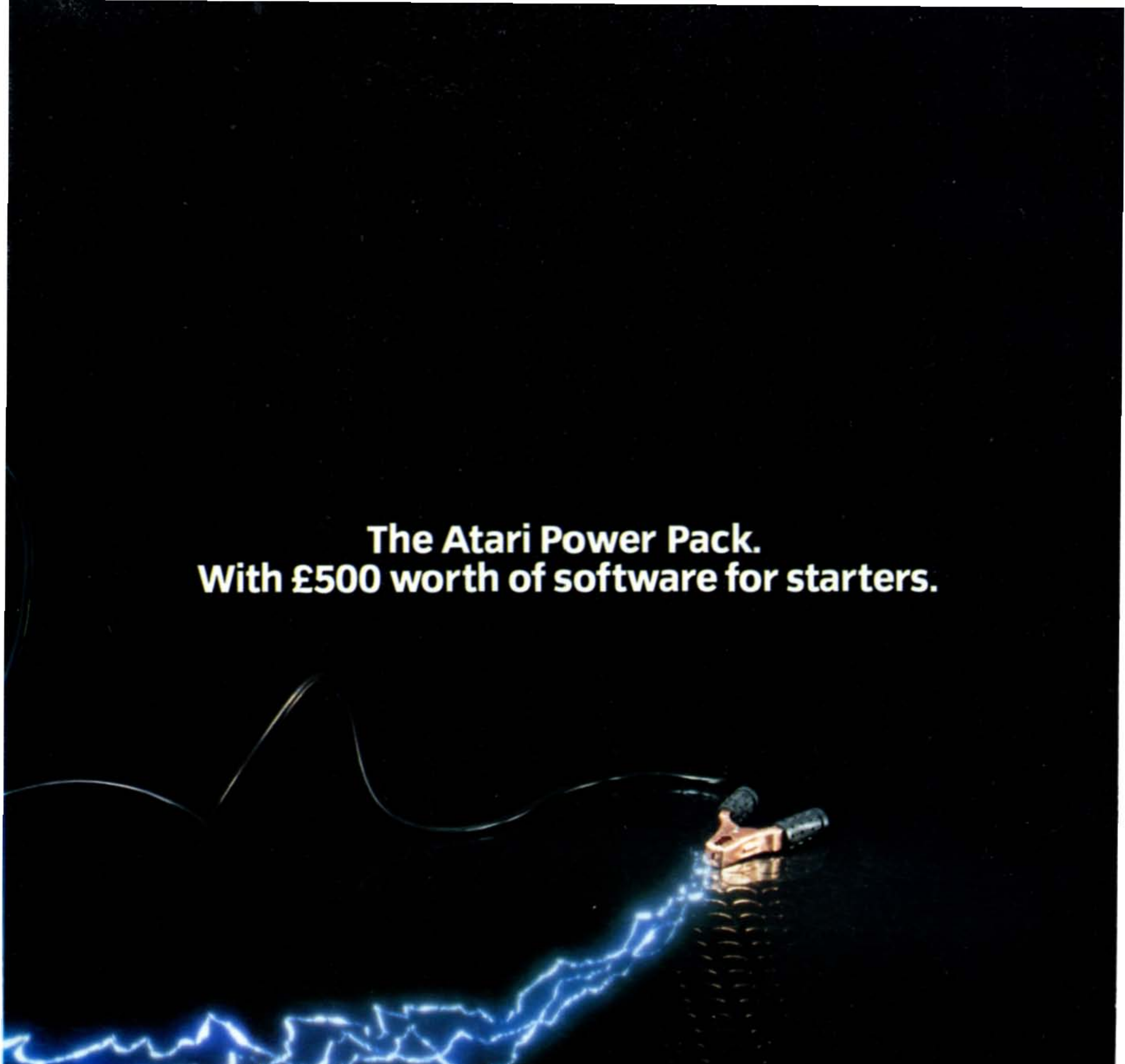
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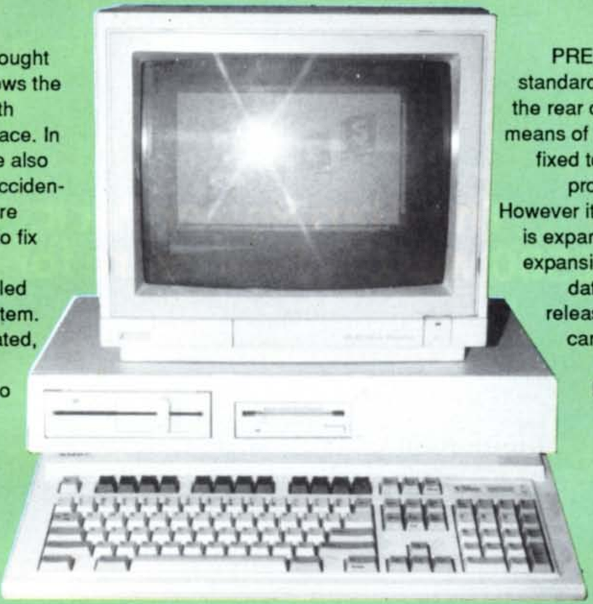

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PROBLEM SOLVED

On the agenda...

- Curing power-up problems
- Viewstore disc space problem
- Altering faulty RGB contrast
- Why programs will not save
- Making an RGB monitor lead
- Converting DFS to ADFS
- Mouse control of the keyboard
- Continuous BBC Micro sounds

Sounds a bit off

I HAVE a BBC Issue 7 with cassette recorder and no extras fitted. I had no problems until I used the Keyboard Player from the February 1985 issue of *Electron User*. I used it several times but eventually it stopped in mid-program and gave a continuous distorted sound. When switched on again the micro emitted the same noise instead of the usual two beeps.

I can still load and save other programs and they all work providing there are no ENVELOPE or SOUND statements – and I wear my ear plugs. I have tried all the Break and *FX calls in the User Guide to no avail. Please can you help? – **J. Wilkes, Crediton, Devon.**

● *As the BBC B does not store any parameters when it is switched off, turning the micro off and then on again will undo anything that a program has done. As this does not solve your problem it is logical to assume that there is a fault in your micro – it can't be the program.*

The problem could be due to a fault in the ram where the ENVELOPE and SOUND parameters are stored, or the rom not being accessed correctly where the envelope events are handled. It could also be the sound chip itself.

Micros, like the rest of us, do grow old and the first thing to go are the sockets. So for a start take the lid off and give a firm push down on all the IC sockets. That might just cure it, but failing that it's a trip to your service engineer.

Monitor lead

MY family has hired a colour television from Granada. We chose a model with an RGB monitor input so that I could use it with my BBC B, but when I looked at the RGB socket on the TV I saw it was of the seven pin din type. The BBC Micro RGB output has six pins, so a standard RGB lead is no good. Consequently I am unable to use the TV as a monitor.

As readymade leads are very expensive – even if I could get the right one – could you please give me the information I need to make my own cable? The TV is Granada's own make.

Still on the subject of TV output, I remember reading an article a few years ago on sending the BBC Micro sound output through the UHF modulator and out of the television's own amplifier. I think it was a fairly simple operation, but does it involve replacing the UHF modulator with one with an audio input? How else could it be done? – **Max Edwards, Faulkland, Bath.**

● *You must ask your suppliers for the pinout of the RGB input, as only they will know what model you have. Then you can make up your own leads getting the connectors from any High Street electronics shop. Readymade ones are expensive simply because they take time to assemble and there is no easy way to automate the process.*

You can put sound on your TV signal by replacing the UHF modulator with one that has a sound as well as a video input. However there is a snag – modulators with sound outputs need 9 volts to drive them. The article you referred to used a battery for its supply – not a very neat solution.

Mousing around

MY system is an issue 7 BBC B with an ATPL solderless rom board which includes 32k of sideways ram. It has worked perfectly for some time now, apart from the analogue port. Some games that use two joysticks have never worked properly – the controlled sprite moves to the right of the screen and only the fire buttons function.

I have made various inquiries and been told that the ADC chip – IC73 – is the only thing that can be causing this, but I've replaced it and the fault is still there. I have even removed the rom board completely from the machine, yet the fault persists.

Also is it possible to program a mouse to control key presses for any or some software? For example, I use Fontstyle for printing, and several months ago I keyed in the Logo program listed in the October issue of *The Micro User*. I've found it excellent apart from the time-consuming use of the keyboard. I feel it would greatly save time if a mouse or trackerball could assist in drawing the logo. – **Glen Wilson, Langside, Glasgow.**

● *If you have replaced the 7002 chip the only thing left is the voltage reference circuit. This is basically a resistor and three forward biased*

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◄ From Page 51

diodes – the circuit is in the back of the user guide. It is likely that one of these diodes has gone open circuit; it is a simple matter to replace them.

The mouse can be made to control anything, but the snag is that you have to write the software to do so. There is no way that you can simply translate mouse movements to command sequences.

Curing a bad starter

I HAVE an Issue 3 BBC B fitted with ADFS and DFS with 1770 chip. Also, on an APTL board in the machine are the usual array of roms such as Wordwise Plus, Publisher, Mega Font, Spellmaster, View Professional, ViewStore, ADT Disc Toolkit. The micro has started to occasionally fail on power up with a blank screen and a piercing single continuous tone in place of the usual two tone one.

If I switch off and on a few times it more often than not works. What is going wrong, and can I easily replace the chip(s) that may be going down? – **I.S. Crawford, Banbury, Oxon.**

● *The problem is probably not a chip but more likely a faulty socket. The symptoms you describe are what happens when the microprocessor does not fetch and execute instructions correctly – in other words when it is broken. You could try brushing all chips and extension boards down or removing and refitting them. If that does not effect a cure you will have to replace some sockets.*

Swap the chips

I HAVE a BBC B and disc drive with a Watford 1.44 DFS. A friend is selling his Acorn ADFS and wondered if I would like it. The trouble is, some people I've asked have said that the ADFS will not work with the Watford interface; others say it will. Could you please help me? – **Andrew Roxburgh (Age 12), Oxton, Birkenhead.**

● *The original Watford DFS uses an 8271 chip whereas the ADFS uses a 1770 one. Now some versions of the Watford board also use the 1770 – if you have one of these it will work.*

See the light

RECENTLY my micro's display has been acting strangely. It fades and brightens several times a second from grey whites to over bright whites. After the micro has been on for about half an hour the problem decreases but it is still there.

This effect appears to be totally random, covers all modes and is not affected when I twiddle the plugs. The mains supply remains constant throughout and the contrast knob still functions correctly, as does all my software

As the monitor is connected to the RGB, I believe that it is at fault as there is no contrast on the RGB lead, but that is as far as I go. I would be very grateful if you could show me the light and dark – or at least tell me how to control my contrast. – **Andrew Bryant, Camberley, Surrey.**

● *An electolytic capacitor inside your monitor is probably breaking down. This is really a problem for a professional to tackle as there are very high voltages flying about inside. Any TV service engineer should be able to tackle it, but be sure to tell him it is a monitor – a friend of mine took one in for repair and when he came to collect it he was told they couldn't find out how to change channels.*

Saving problems

I HAVE a Solidisk 1770 DFS and a Watford double 80/40 disc drive. Could you please advise me as to why I can save data from programs – things like letters in Wordwise and data from System Delta – but when I try and save a program that I have written myself it will not write to disc? I have tried saving 40 track, 80 track, 40 double density, 80 double density on drive 0 and the same on the other three sides, but it will not have it.

I can format discs, verify them, build a !Boot file and also lock files – *Access name L – but once they are locked I cannot unlock them – *ACCESS name. Can you please help me? – **Karrl Richardson, Northampton.**

● *If you can write to the disc from programs and build a !Boot file there is nothing wrong with your disc drive. The most likely thing is that you are doing something wrong, but without watching you I can't think what it might be.*

However, it could be that part of the DFS is out of action due to a bad connection in the socket making some commands work and others not. Finally it could be a very subtle fault in the disc controller chip – I have found that this can sometimes give very strange results.

Making more room

I USE ViewStore continuously and recently decided to delete a large number of records in order to gain more free space on a disc that was dangerously close to being full. However, after hours of deleting and compacting to get the *MAP to read single figures, even though I had removed many records my disc showed no space saving whatsoever.

When I examined the sectors using ADT Disc Toolkit all the data I had eliminated from ViewStore was still there, taking up valuable space. How can I release this space that I need for more important data? – **I.S. Crawford, Banbury, Oxon.**

● *It looks as though ViewStore is retaining the maximum size of the files so that they can be extended without difficulty. When you delete data from a disc it is not removed, but the software is told that the space is available if needed. You can try copying the files on to another disc using the utility supplied with ViewStore.*

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High speed in an E-type maze

The Mad Hatter continues his tour of the mazes that muddle so many

WE started our beginners' look at solving mazes last month by dealing in some detail with one that is description-dependent for its puzzlement and solution. Now we are going to consider the other two – the exit and inventory-dependent types. The logical approach will win just about every time: All it requires is a morsel of persistence – up to an hour's work with the more complex types – and after that you can roam through one at will.

This is important because quite often the programmer will have designed the game so that you have to go through the maze more than once to complete it. This is when random key-bashers succumb to weeping, wailing and gnashing of teeth before slinging the hapless micro through the nearest window.

The exit-dependent maze is fairly straightforward to solve and only one trap can be laid for the unwary – it is just possible it could be an inventory-dependent one in disguise. Your E-type maze will have descriptions like this:

You are in a maze – exits are to the North, East, Southeast and South.

First of all test for the main exit through which you have just entered by reversing your direction. If you came into it because you had typed North, type South and check that this takes you out again. If it doesn't, don't despair: Drop one of the objects you are carrying and pray that it doesn't disappear – this ensures that the initial location can always be identified.

If you *can* leave the maze, save your position at once, so that if disaster strikes you can at least start again with your sanity more or less intact. If you can't leave the maze, save at the first location where you have dropped something.

Some kind programmers warn that a maze can be found in a certain direction by stating so explicitly. Occasionally the hint is more oblique – if *A field of maize lies to the Northeast* can be called oblique, that is. If it is called a field of *corn*, be suspicious – after all to an American *maize* and *corn* are synonymous, while *corn* generally implies *wheat* to us British. In any event if you come across something like this, and neglect to save your current status you're even dafter that I am.

So: Back to our original location description, which reads: *You are in a maze; exits are to the North, East, Southeast and South.* Start by going North and check the description. If it is identical you have not moved. If, on the other hand, the description reads: *You are in a maze; exits are to the North, East, Southwest and South* you certainly have.

Enter this fact on your map – call it location two – and then move South, which ought to take you back to location one. If it doesn't, start notes on location three and begin to suspect that you are in a heavily disguised inventory-dependent maze. The final check on this aspect is made by moving North from location three to see if it takes you back to location two. If the new description reads: *You are in a maze; exits are to the North, East, and South.* Cut your losses, return to your saved position just outside the maze and deal with it in the way I shall show in a moment.

One final point on E-type mazes: Every time the exits shown vary in number or direction you have moved. Simply test every direction given in any location thoroughly before moving on to the next. As you work steadily on, the average maze – of say, a dozen locations – will yield up its secrets with increasing rapidity. There's a snowball effect that often means some locations are completely mapped while you are dealing with three or four others which all connect with them.

Inventory-dependent mazes are often quite short by comparison with the other two types, though it depends on how devious the programmer is and whether or not there is a limit on your ability to carry objects. The usual description of a maze of this type is: *You are in a maze, exits lie in every direction.* An occasional variation simply states that there are no visible exits – a ploy designed to strike despair into the beginner's heart.

So long as you have an armful of goodies – swords, jewels, platinum pyramids and the like – despair is the last emotion you need entertain. If you are carrying the inestimable Ming Vase, be a trifle circumspect about using the verb DROP as part of your input. Check if an alternative is available.

Apart from that caveat, all is plain sailing. Having made the usual initial exit check, drop an item at location one – making a note of what it is – and begin the methodical process of entering the eight main compass directions together with Up and Down. Every time the object remains visible it is, naturally, an indication that you have not moved.

Each time a genuine move is made, drop another object until the maze is thoroughly mapped. Only one nasty surprise occasionally pops up: This is where you have a limit to the number of items that you can carry. Sometimes the programmer will deliberately design a maze with – say – two more locations than the number of items you can carry.

The answer here is to map the first two or three locations carefully and then pick up the items you deposited and use them later on. Do make sure that your note-making is impeccable here, or you are likely to end up with boiling blood. If readers are interested enough, I'll deal with the nastier variants of mazes in the future.

How to make a mint in Elite

I have had the usual monthly spate of letters on aspects of **Elite**, and two of them have points worth passing on while a third shows that Hatters must not take things for granted. Andrew Gilmore has found a good wheeze for making money hand over fist without actually doing anything inparticular. He has a BBC B and one of the older versions of the game – and this is what he has to say.

After docking at a planet with a high enough tech level to sell mining lasers, call up the equipment price list. Then buy mining lasers – placing them at the rear of your ship – and continue to buy them in the same position. Each time you do so you'll receive 3570.3 credits. As Andrew says, if it works for you, budget problems become a thing of the past.

Alan Gibson has a tip for those who have Master 128 versions of **Elite** and who would like to encounter our old friend the mystery ship. Choose a corporate state – or similar – system and keep jumping away from the planet. Eventually the planet re-appears, though usually minus its sun. Blast everything you see and when you can't jump – while there's nothing on the scanner – you can be sure that the mystery ship is around.

Two readers, Mark Ainsworth and friend Ben, have encountered witch space without knowing what it was – they christened it Thargonia. The clue that you are entering witch space is the way the hyperspace screen behaves: The pattern appears twice, and there you are marooned with a few Thargoids around.

The trick in witch space is to destroy all the mother ships and scoop up the baby Thargons. These then become Alien Items and – best news of all – they don't take up any room in the cargo hold. These alien items can be sold for around 64 credits when you dock at poor agricultural systems.

To get out of witch space – only possible once the Thargoids have been destroyed – press f5 for the short range chart, choose a system and press H in the usual way. Mark likes to mine asteroids with a rear-mounted laser – I prefer mine on the left: You pays your money and you takes your choice.

Revenge is mine...

Last month I left you in the trophy room in **Programmer's Revenge**, so return to the hall – our usual embarcation point – and take the stick, since you'll soon need it. Proceed N as far as the crossroads and then go W, N and W to the bridge picture then W again. Here you should SHAKE STICK to turn it into an umbrella and then you can cross the bridge safely. Keep going west to the T junction.

From here you need to go S, SW, E and NW where you will see a spade – which you can safely ignore – and on E, NE to the jetty. You must be empty-handed here, so drop the umbrella which – if you have followed this solution carefully – should be the only thing you are carrying.

Move E into the boat and keep on going east

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until you reach the island. Now you have a bit of ferrying to do – but you can't rush things. There are a monkey, a dog and some gold-plated bananas which are all treasures, and the monkey has to be around quite a bit.

Take the monkey and go back west to the jetty where you should drop it and return to the island. Now take the dog and repeat the process – but take the monkey and then drop the dog. Return to the island with the monkey, take the bananas, drop the monkey and back you go to the jetty where you should drop the bananas. One last trip to the island is needed. Take the monkey back to the jetty and collect the dog, bananas and umbrella to complete this sequence.

From the jetty travel S to the sandy area, ignoring the fool's gold, and return to the T junction by moving E (continue to ignore the spade) S, SW, SW, NW and N. Now you should go NE and E twice across the bridge and stop. Drop the umbrella here before you get to the picture because if you carry it any further it will blow away Now you can go E, SE, E and E to the crossroads and then make your way back into the house where you should drop the dog (11 points), monkey (12) and bananas (13) before returning to the hall to gird yourself for further action. *(To be continued.)*

Problem Corner

Patrick Marter's dad Tony is stuck in *Castle Dracula* and I only have a solution to the Kansas adventure *Dracula*. How does Tony cross the chasm, please?

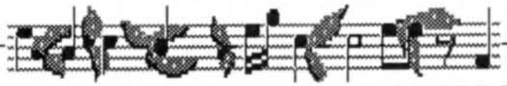
Hatter's Helpline

Patrick Marter is stuck in ***Perseus and Andromeda****. He's managed to get the discus, helmet and winged sandals and is now not sure what to do. He's missed something out j\by the look of his letter.*

Having got the helmet, you DON it – nice old-fashioned word, that – retrieve the discus and then go E as far as possible. Go on to the dais and pray to get the shield and then go to the temple and pray again for the sandals – which you also don.

Now go on to the pedestal and WAIT there after which you can fly north and then down. Down you go once more to find that you are on an island – and off you go adventuring again.

In ***Egyptian Adventure*** *Patrick has managed to get a loan from the bank manager but wonders how to handle other characters in the game. Well, Ahmed is bribeable, the curator will need to see the colour of your money – and other things – and the raven needs to be shown something by way of a sign.*



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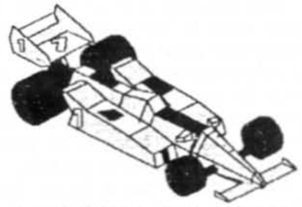

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It's sunnier on the C-Front

Steve Turnbull finds his C programming life made quite a bit easier

Product: !C-Front (inc. !SetType and !StickyBd)
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THE two releases of the ANSI C compiler for the Archimedes were not designed for the Risc OS non-multitasking environment and programmers have had to resort to long and tedious command lines to use the software. But Mitre Software has a solution for weary fingers.

Producing a compiled C program from the source file – at its simplest – involves just one command:

```
cc. c.myFile
```

which puts together the target C software and would call it $.myFile. Even from the Risc OS DeskTop this is not too much of a problem – press f12 and type.

But *real* C applications are usually produced from several sources, lots of flags being set and with a target name that's different from the source. So anything that aids the programmer is a real boon.

!C-Front is simply a multi-tasking front end to the standard Acorn compiler – not supplied – and makes compilation much simpler. After a small amount of set up, which is fairly well described in the 32 page manual, and moving the relevant files across, you just double-click the !C-Front icon – which is an anti-aliased C on a 3D plaque. This then loads up on to the icon bar and you're ready to go.

To do a simple compilation drag the text file of the C source code on to the icon. You get a window to confirm that you really do want to compile, and away it goes. A standard task window is used to keep track of the process and any error messages appear there.

Clicking Menu on the C-Front icon brings up a menu with the usual *Info* and *Quit* plus three others: *Options* is used during the set up procedure to specify the directory paths of the C compiler and linker. There are radio buttons to set whether to use disc or ram disc, using the latter speeds up compilation but you can't use it on a 1Mb machine. In addition the non-Risc OS nature of releases 1 and 2 of ANSI C means that the linker cannot be used with the ram disc.

There's a Use Edit flag which routes all error output to a file and automatically loads it into a text editor when compilation is complete. Finally the Reminders flag is primarily for the beginner and when set all the currently set command line flags are displayed, and can be edited, before compilation starts.

The main menu option *Directives* allows you to explicitly set the flags for the Compiler, Linker and Maker (of which more later) programs. In fact there are so many choices in the Compiler list that it would extend right off the screen. However, the Wimp Manager automatically adds a scroll bar whenever a menu list looms too large.

You can save your choices using another option on the main menu. It is possible to load the flags automatically by putting a comment into the first line of the C program to be compiled, otherwise you can just double-click a saved definition file.

If you are working on a large project you may have several source files and if you change just one it's annoying to have to recompile the whole lot just to test the modification. This problem is solved using the MitMake utility.

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Comprehending compilers

For the uninitiated or those used to using Basic the subject of compiled languages can be difficult to understand – advantages and disadvantages aside what does a compiler do?

Very simply, a compiler converts one computer language into another. But more usefully it converts a language that it's easy for humans to understand – like C – to one that the micro can understand: Machine code.

However, for C and most other compiled languages like Pascal or Modula 2, it does it via an intermediate code. Strictly speaking the compiler simply produces this intermediate code then a linker produces the final executable code.

This system is used so that multiple files can be compiled and then linked together to produce the final result. Additionally you can have library files of the intermediate code already prepared so they don't need to be recompiled with the main program. They just get linked in at the end.

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This is effectively a command file that allows selective recompilation and linking of files based on whether the file is older than any of its dependent files.

The command language has a lot of useful features such as defining macros, conditional constructs and including other MitMake files. While there are certain additions to make use of the Risc OS facilities I found the whole thing unnecessarily complex. It's true that MitMake is based on standard C Compiler Make utilities so someone coming from another machine would find it easy to use.

Summing up

Release 3 of the Acorn ANSI C Compiler is due out soon and that will almost certainly improve the situation as far as file paths go, however rumour has it that even this won't have a Risc OS front end, so an upgrade is to be expected.

Although !C-Front suffers from the original software demanding certain files to be in specific directories – a distinctly non-Risc OS approach – it is certainly a boon to C programmers.

New utilities enhance package

Two other extremely useful utilities come with !C-Front – !SetType and !StickyBd. The former is very simple to use – once loaded into the machine you drag a file's directory icon on to !SetType and the file information is shown. You can then open a window which lists all the currently available file types and you can select one with a single mouse click – no more pressing f12 and typing long settype commands.

!StickyBd is also simple but much more extensive in use: When loaded no icon appears on the bar but the word Default shows in the top left corner of the screen. Now if you drag a file icon out of a directory window and on to the background it just sticks there.

So what you can do is drag all your most commonly used utilities on to the background, arrange them how you want, and then save that format. Now you can run one of these application simply by double-clicking its icon on the background.

Most of the directory window-style operations are available and Mitre has carried forward the mouse button actions logically: Double-clicking with Adjust causes the icon to vanish when the application is loaded in the same way that a directory viewer is removed when an icon in it is double-clicked.

Another option let's you load up a background picture. You don't have to use a full saved screen, just a small sprite will do as it's scaled to fit.

While of most use in a hard disc system, I've found !StickyBd to be very useful indeed.

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Protection racket

Barnaby Short shows how to make your files safer

IT'S true to say that any form of disc protection you can devise for a commercial disc can be broken by any pirate with enough dedication and know-how. But there is a way of safeguarding your personal files so that no one can break into them at all.

The program given in the listing generates a short machine code that garbles – and restores – any file using the exclusive-or command from a key code you type in. Since only you know the code and exclusive-oring produces such a meaningless jumble, it's the perfect way of securing your personal data.

Type in the program, ensure you've made no typing errors using the checksums, and save it as Protect. When run it produces a machine code program called PC – for *P*rotect *C*ode.

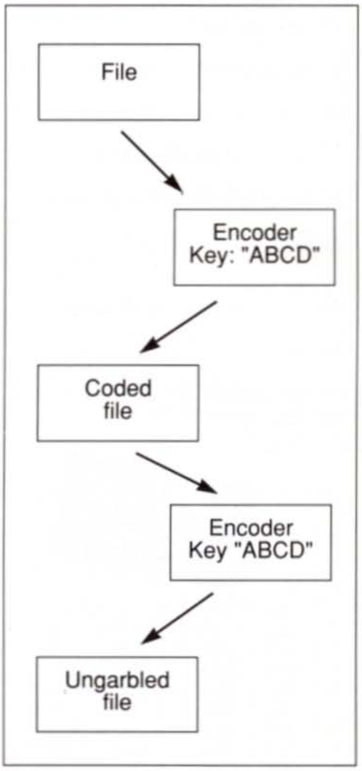
When you type *PC it asks you for a file name then loads it. Next you need to enter the key code of up to 255 characters. It then garbles the area of memory into which the file was loaded and asks for a name for the encoded file. To disentangle it follow exactly the same procedure and type in precisely the same key – otherwise the file will be garbled even further.

So to code a Basic program just type *PC plus Return. Then, as prompted, enter the filename – you can include full file path name details if you wish – followed by your key. A one-letter key is not really enough and each character should preferably be different, but you can use almost any one that can be typed at the keyboard – including colour codes but not control codes.

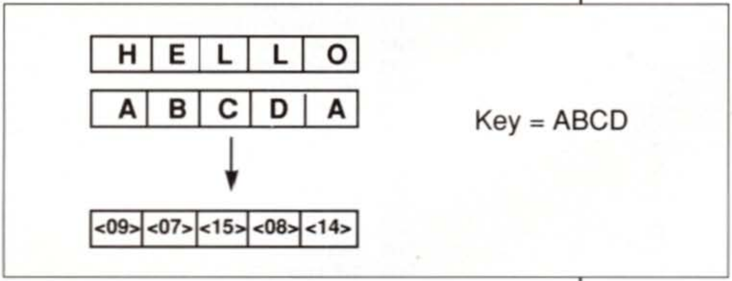
Press Return and the file will be encoded. Then you are prompted for a save name which can be the same – you can use the cursors and Copy keys.

To get double – triple or more – protection you can encode a file more than once. You must remember which keys you used of course, but it doesn't matter what order you type them in. Also the longer you make your key the more difficult it would be to decode.

One final point: The program can be misused by someone else encoding your files – so keep it separate and safe.



Encoding and decoding a file



Using exclusive-or to encode a word

```
 10 REM File Protector
 20 REM By Barnaby Short
 30 REM (c) The Micro User
 40 PROCdeclare
 50 PROCassemble
 60 PROCsave
 70 END
 80 :
 90 DEF PROCdeclare
100 code  =&A00
110 sf_buf=&500
120 ck_buf=&600
130 df_buf=&700
140 :
150 oscli =&FFF7
160 osbyte=&FFF4
170 osword=&FFF1
180 oswrch=&FFEE
190 osasci=&FFE3
200 osfile=&FFDD
210 :
220 P%=&50:[OPT 2
230 .himem  OPT FNw(0)
240 .page   OPT FNw(0)
250 .hiaddr OPT FNw(0)
260 .point  OPT FNw(0)
270 .ck_len OPT FNb(0)
280 .base   OPT FNw(0)
290 .count  OPT FNb(0)
300 ]
310 ENDPROC
320 :
330 DEF PROCassemble
340 FOR L%=0 TO 2 STEP 2
350 P%=code
360 [OPT L%
370  JSR initialise
380  JSR src_filename
390  JSR load_src
400  JSR coding_key
```

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```
410  JSR code_file
420  JSR dst_filename
430  JSR save_dst
440  RTS
450 \
460 .initialise
470  LDA #22:JSR oswrch
480  LDA # 7:JSR oswrch
490  OPT FNloadXY(title)
500  JSR op_line
510 \
520  LDA #130:JSR osbyte
530  OPT FNputXY(hiaddr)
540  LDA #131:JSR osbyte
550  OPT FNputXY(page)
560  LDA #132:JSR osbyte
570  OPT FNputXY(himem)
580  RTS
590 \
600 .op_line
610  OPT FNputXY(point)
620  LDY #0
630 .op_line_loop
640  LDA (point),Y
650  BEQ op_line_exit
660  JSR osasci
670  INY
680  JMP op_line_loop
690 .op_line_exit
700  RTS
710 \
720 .src_filename
730  OPT FNloadXY(sf_prompt)
740  JSR op_line
750  OPT FNloadXY(sf_buf)
760 \
770 .ip_line
780  OPT FNputXY(ip_blk)
790  LDA #0
800  OPT FNloadXY(ip_blk)
810  JSR osword
820  BCC ip_line_exit
830  OPT FNerror(17,"Escape")
840 .ip_line_exit
850  RTS
860 \
870 .load_src
880  OPT FNloadXY(sf_buf)
890  OPT FNputXY(file_blk)
900  OPT FNgetXY(page)
910  OPT FNputXY(file_blk+2)
920  OPT FNgetXY(hiaddr)
930  OPT FNputXY(file_blk+4)
940  LDA #0:STA file_blk+6
950  OPT FNloadXY(file_blk)
960  LDA #&FF:JMP osfile
970 \
 980 .coding_key
 990  OPT FNloadXY(ck_prompt)
1000  JSR op_line
1010  OPT FNloadXY(ck_buf)
1020  JSR ip_line
1030  STY ck_len
1040  RTS
1050 \
1060 .code_file
1070  OPT FNgetXY(file_blk+10)
1080  OPT FNputXY(count)
1090  OPT FNgetXY(page)
1100  OPT FNputXY(base)
1110  LDY #0:LDX #0
1120 .cf_loop
1130  LDA (base),Y
1140  EOR ck_buf,X
1150  STA (base),Y
1160  INX
1170  CPX ck_len
1180  BNE cf_skip1
1190  LDX #0
1200 .cf_skip1
1210  INC base
1220  BNE cf_skip2
1230  INC base+1
1240 .cf_skip2
1250  DEC count
1260  LDA count
1270  CMP #&FF
1280  BNE cf_skip3
1290  DEC count+1
1300 .cf_skip3
1310  LDA count
1320  ORA count+1
1330  BNE cf_loop
1340  RTS
1350 \
1360 .dst_filename
1370  OPT FNloadXY(df_prompt)
1380  JSR op_line
1390  OPT FNloadXY(df_buf)
1400  JMP ip_line
1410 \
1420 .save_dst
1430  LDA #0
1440  STA file_blk+12
1450  STA file_blk+13
1460  STA file_blk+16
1470  STA file_blk+17
1480  CLC
1490  LDA page
1500  ADC file_blk+10
1510  STA file_blk+14
1520  LDA page+1
1530  ADC file_blk+11
1540  STA file_blk+15
1550  OPT FNgetXY(page)
1560  OPT FNputXY(file_blk+10)
1570  OPT FNloadXY(df_buf)
1580  OPT FNputXY(file_blk)
1590 \
1600  OPT FNloadXY(file_blk)
1610  LDA #0
1620  JMP osfile
1630 \
1640 .title
1650  OPT FNs("File Protection Program"
+CHR$13+CHR$0)
1660 .sf_prompt
1670  OPT FNs("Source filename:"+CHR$0)
1680 .ck_prompt
1690  OPT FNs("Coding key:"+CHR$0)
1700 .df_prompt
1710  OPT FNs("Destination filename:"+C
HR$0)
1720 .ip_blk
1730  OPT FNw(sf_buf)
1740  OPT FNb(255)
1750  OPT FNb(32)
1760  OPT FNb(255)
1770 .file_blk
1780  OPT FNq(18)
1790 ]:NEXT:ENDPROC
1800 :
1810 DEF FNloadXY(V%)
1820 [OPT L%:LDX #V%MOD256
1830  LDY #V%DIV256:]:=L%
1840 :
1850 DEF FNputXY(V%)
1860 [OPT L%:STX V%:STY V%+1:]:=L%
1870 :
1880 DEF FNgetXY(V%)
1890 [OPT L%:LDX V%:LDY V%+1:]:=L%
1900 :
1910 DEF FNerror(E%,e$)
1920 [OPT L%:BRK:OPT FNb(E%)
1930  OPT FNs(e$):BRK:]:=L%
1940 :
1950 DEF FNb(B%)?P%=B%:P%=P%+1:=L%
1960 :
1970 DEF FNw(W%)!P%=W%:P%=P%+2:=L%
1980 :
1990 DEF FNd(D%)!P%=D%:P%=P%+4:=L%
2000 :
2010 DEF FNs(s$)$P%=s$:P%=P%+LENs$:=L%
2020 :
2030 DEF FNq(Q%)P%=P%+Q%:=L%
2040 :
2050 DEF PROCsave
2060 PROCoscli("SAVE PC "+STR$~code+" "
+STR$~P%)
2070 ENDPROC
2080 :
2090 DEF PROCoscli($&700):LOCAL X%,Y%
2100 Y%=7:CALL oscli:ENDPROC
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = B363 3
  50 = 126A 3
  60 = 90DB 3
  70 = FD2E B
  80 = 9719 E
  90 = 9E1C E
 100 = 55D9 8
 110 = 6242 6
 120 = E614 A
 130 = 70A2 E
 140 = 9719 B
 150 = CDE9 E
 160 = 7966 7
 170 = 4EF9 A
 180 =   78 5
 190 = AA42 0
 200 = BC36 A
 210 = 9719 0
 220 = FDA4 B
 230 = D847 1
 240 = 186D 2
 250 = 226C D
 260 = 2A74 6
 270 = 2470 1
 280 = 405C 8
 290 = 96E8 E
 300 = 8B58 4
 310 = ED0F 9
 320 = 9719 C
 330 = 98A5 7
 340 = AAB9 A
 350 = 3FB3 C
 360 = 1EF3 A
 370 = 516E 2
 380 = 7556 4
 390 =  B07 A
 400 =  360 E
 410 = 2A75 4
 420 = 1A68 C
 430 = 3279 9
 440 = 9843 4
 450 =    0 4
 460 = 5B39 B
 470 = E9F1 D
 480 = 7B22 5
 490 = 8F31 B
 500 = AB1B 3
 510 =    0 3
 520 = BC7A 9
 530 = 94AE E
 540 = BF0F 4
 550 = B596 B
 560 = BA90 7
 570 = 687D 3
 580 = 9843 2
 590 =    0 2
 600 = EEE1 E
 610 = 31D5 4
 620 = 9CF1 2
 630 = B208 3
 640 = FFD4 D
 650 = ACB0 5
 660 = 890B 9
 670 = 6623 D
 680 = 3EB7 1
 690 = 6DAE 7
 700 = 9843 7
 710 =    0 7
 720 = B08F B
 730 = 7098 4
 740 = AB1B 9
 750 = 20EB 7
 760 =    0 7
 770 = 4FC4 4
 780 = 8A3C 8
 790 =  295 4
 800 = D815 6
 810 = 62D8 4
 820 = 41D0 B
 830 = 8499 6
 840 = 6690 7
 850 = 9843 B
 860 =    0 B
 870 = E966 1
 880 = 20EB 3
 890 = 33A6 3
 900 = 5D80 E
 910 = 3D36 F
 920 = 7F42 7
 930 = 9790 6
 940 = F323 2
 950 = EE30 0
 960 =  8A0 7
 970 =    0 7
 980 =  937 3
 990 = BA3D 0
1000 = AB1B E
1010 = 59D3 A
1020 =  A3E 4
```

Get it right!

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```
1030 = 69A3 8    1290 = 6071 F    1550 = 5D80 D    1810 =  8EB 1    2070 = ED0F 5
1040 = 9843 5    1300 = 89E4 8    1560 = 840E 1    1820 = 3E03 E    2080 = 9719 C
1050 =    0 5    1310 = 1C0D 4    1570 =  ED4 E    1830 = CDCC E    2090 = 1C6E E
1060 = 9619 0    1320 = 4AEF 5    1580 = 33A6 2    1840 = 9719 0    2100 = 7002 B
1070 = 9825 2    1330 = F166 7    1590 =    0 2    1850 = 4B23 2
1080 = B124 A    1340 = 9843 5    1600 = EE30 2    1860 = AB83 2
1090 = 5D80 C    1350 =    0 5    1610 =  295 3    1870 = 9719 D
1100 = 6AEC 0    1360 = DFB1 5    1620 = 2219 E    1880 = 94C2 9
1110 = 5A73 E    1370 = F8F4 D    1630 =    0 E    1890 = C3C5 6
1120 = E8EA 7    1380 = AB1B 2    1640 = FD02 8    1900 = 9719 4
1130 = 4E3D 2    1390 =  ED4 C    1650 = 2A38 B    1910 = 52A7 2
1140 = 87FF F    1400 = 613B 2    1660 = 95BE 3    1920 = B903 C
1150 = 3FB3 6    1410 =    0 2    1670 = 3ED8 8    1930 = 8ACC 7
1160 = 7602 5    1420 = D018 D    1680 = 9024 2    1940 = 9719 0
1170 = 2609 E    1430 =  295 D    1690 = 6A5B F    1950 = 4B52 C
1180 = A6BE C    1440 = 28B7 2    1700 = 77EB 5    1960 = 9719 B
1190 = EA45 A    1450 = 3896 0    1710 = 6F27 7    1970 =  B37 5
1200 = A9A6 8    1460 = 6833 1    1720 = 9156 6    1980 = 9719 1
1210 = 9511 C    1470 = 7812 3    1730 = D392 B    1990 = F27B 9
1220 = 96DD D    1480 = 74FB 5    1740 = B83D 8    2000 = 9719 A
1230 = 1960 0    1490 = 9CD9 F    1750 = C061 E    2010 = 74F2 F
1240 = 99C5 1    1500 = 4797 6    1760 = B83D 0    2020 = 9719 1
1250 = 12C2 D    1510 = 4871 E    1770 = E80A 1    2030 = D864 5
1260 = 1C0D 0    1520 = FBBC F    1780 = AB42 B    2040 = 9719 8
1270 = 66FF 3    1530 = 57B6 F    1790 = 953B F    2050 =  EB7 B
1280 = 86FC 0    1540 = 5850 D    1800 = 9719 1    2060 = 65FC D
```

MICRO MEMORY

Anothger tip you may have forgotten. . . or never ever known

FEEDING a sheet of paper while you're using an application like View, Wordwise or Mini Office II can easily be achieved from the keyboard without the need to reach for the switch on the printer. Just enter * and you are ready to enter a command.

Hold the control key down and press B, L and C in that order. The sheet will automatically feed to the next perferation provided its was correctly aligned in the first place.

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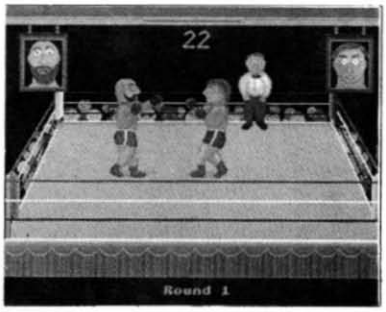

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Jingle bells

Enjoy festive music with this easy to use routine from Ken Goodacre

JINGLE WRITER will enable anyone to create music. Just use the program and tap out a tune on your micro keyboard and play it back any time you want. Don't worry if you're not very musical as the software has features to enable anyone to play a tune. And you can even create procedures to use in your own programs.

Enter the listing and check you have keyed it in as printed using Get it Right! Save it and run it. You will be presented with the menu shown below and will be in Compose mode – ready to start tapping out a tune. You can return to Compose mode at any time by pressing Escape.

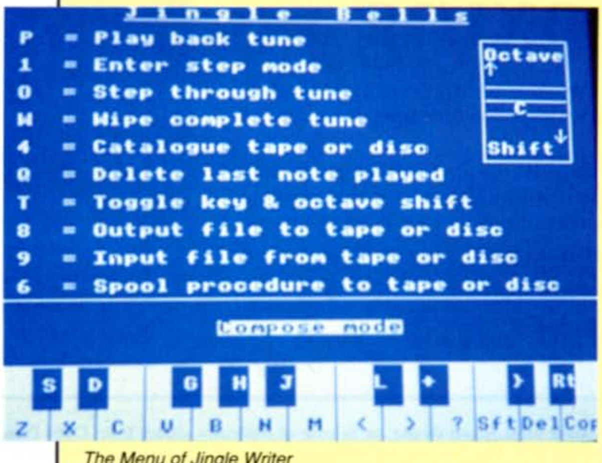
When you play a tune on the micro keyboard in real time it is recorded and you can press P to play it back – warts and all. The last note entered can be deleted using Q. Not only will the pitch of the notes be as played, but so will the lengths and the duration of the spaces between them will also be as they were played.

But don't worry if the timing of the tune is unsatisfactory: You can step through the tune using only one key, leaving you free to concentrate on the timing which, of course, will be recorded and used when the tune is played back.

You can use the up and down arrow keys to move the key up or down a complete octave or press T to toggle and use the same keys to move up or down a semitone.There's also an option to wipe the complete tune – W – and to

Jingle Bells: A procedure generated by the program

```
1000 PROCbell
 1010 END
 1020 :
 1030 DEFPROCbell
 1040 ENVELOPE1,3,0,0,0,0,0,0,121,-10,-1,
-2,120,120
 1050 RESTORE1090:FORB%=0TO93:READA%,P%,D
%:TIME=0
 1060 IFA%>0REPEAT:SOUND&0011,A%,P%,1:SOU
ND&0012,A%,P%+1,1:UNTILTIME>=D%ELSEREPEAT
UNTILTIME>=D%
 1070 NEXT:ENDPROC
 1080 :
 1090 DATA1,117,8,0,0,23,1,117,9,0,0,25
 1100 DATA1,117,37,0,0,21,1,117,9,0,0,21
 1110 DATA1,117,8,0,0,23,1,117,33,0,0,21
 1120 DATA1,117,11,0,0,18,1,129,9,0,0,22
 1130 DATA1,101,29,0,0,11,1,109,7,0,0,8
 1140 DATA1,117,73,0,0,30,1,121,15,0,0,19
 1150 DATA1,121,14,0,0,18,1,121,36,0,0,19
 1160 DATA1,121,17,0,0,14,1,117,16,0,0,16
 1170 DATA1,117,37,0,0,19,1,117,14,0,0,19
 1180 DATA1,109,14,0,0,18,1,109,13,0,0,15
 1190 DATA1,117;11,0,0,21,1,109,40,0,0,20
 1200 DATA1,129,37,0,0,19,1,117,11,0,0,19
1210 DATA1,117,9,0,0,22,1,117,38,0,0,18
1220 DATA1,117,12,0,0,17,1,117,11,0,0,18
1230 DATA1,117,35,0,0,21,1,117,12,0,0,18
1240 DATA1,129,12,0,0,20,1,101,29,0,0,12
1250 DATA1,109,9,0,0,8,1,117,104,0,0,22
1260 DATA1,121,14,0,0,15,1,121,14,0,0,18
1270 DATA1,121,42,0,0,16,1,121,10,0,0,7
1280 DATA1,121,11,0,0,23,1,117,12,0,0,21
1290 DATA1,117,29,0,0,13,1,117,11,0,0,6
1300 DATA1,129,15,0,0,15,1,129,12,0,0,20
1310 DATA1,121,14,0,0,18,1,109,16,0,0,20
1320 DATA1,101,49,0,0,2,1,109,10,0,0,19
```



```
Jingle Bells
P  = Play back tune
1  = Enter step mode
0  = Step through tune
W  = Wipe complete tune
4  = Catalogue tape or disc
Q  = Delete last note played
T  = Toggle key & octave shift
8  = Output file to tape or disc
9  = Input file from tape or disc
6  = Spool procedure to tape or disc

Compose mode
```

The Menu of Jingle Writer

```
 10 REM Jingle Bells
 20 REM By K Goodacre
 30 REM (c) The Micro User
 40 ON ERROR:GOTO 3340
 50 *KEY10 O.|MRUN|M
 60 *TV255
 70 *FX4,1
 80 *FX200,1
 90 KA%=401:REM Must be odd number!
100 GOTO150
110 PROCkeyup:RETURN
120 PROCtranup:RETURN
130 PROCkeydown:RETURN
140 PROCtrandown:RETURN
150 PROCinit:MODE4:VDU19,0,4,0,0,0
160 PROCkeyboard:VDU23,1;0;0;0;0;
170 PROCinst
180 PROCmode("Compose"):IFO%=2q%=q1%
190 PROCmark(my%,0):O%=0:*FX200,0
200 REPEAT:PROCkeys:UNTIL O%>0
210 IFO%=1PROCreplay
220 IFO%=2PROCstep
230 IFO%=3PROCspool
240 IFO%=4PROCopenout
250 IFO%=5PROCopenin
260 IFO%=6PROCfull
270 GOTO180
280 END
290 DEFPROCkeys
300 IFINKEY-98PROCplay(C%):GOTO300
310 IFf1%=1PROCstore
320 IFINKEY-106PROCplay(A%+48):GOTO320
330 IFf1%=1PROCstore
```

catalogue the tape or disc – 4.

The tune created can then be saved to tape or disc by pressing 8 and retrieved later by entering 9. Pressing 6 spools a stand-alone procedure to tape or disc that plays the tune in memory. You can then *EXEC this into your own Basic program and it will play the tune as it was originally entered. This is useful when you're writing games or any other program that requires the odd jingle.

So there you have it, an easy way to create music. The panels show a summary of the menu options and the keys you need to press to play two Chrismas carols – enter them at any speed, you can add the rhythm later. On the disc supplied to subscribers – see Page 127 – there are several demonstration tunes ready for you to load and play. We'll repeat them on the January disc in case you missed the December one.

The keys to press for Good King Wencleslas are:

```
BBBNBBX CXCGBB
BBBNBBX CXCGBB
><MNMNB CXCGBB
XXCGBBN ><MNB<B
```

And for Silent Night:

```
BNBC BNBC
>>M <<B
NN<MN BNBC
NN<MN BNBC
>> Shift > M < ?
<BCBVXZ
```

Jingle options

Compose
The program starts in this mode and any notes played are recorded in memory. The last note in memory can be deleted using Q and will be sounded as it is erased. Holding Q down will, after a short pause, delete one note after the other. Pressing Escape at any time except when spooling or saving a file will return you to Compose mode.

Playback
In this mode you will hear the tune held in memory. Remember that if you leave a long pause between notes it will be there – just as recorded – so don't think the program has locked up. If you want to leave this mode before the tune ends press Escape. The tune in memory will not be affected.

Step
Press 1 to enter this mode then use O to step through the tune. Note lengths and rests are stored at the rate the key is pressed. When played back the tune will be at the rate at which it was stepped.

Outputting a file
If you wish to save a tune to tape or disc, press 8. You will be asked for the name of the tune, which is the filename, and must follow the usual constraints – seven letters for a disc or ten for tape. Once this has been entered, the tune will be saved for future use.

Inputting a file
To retrieve a tune from tape or disc, press 9 and enter the name. When the file is found it will be loaded into memory providing it is the correct type. If you try to load a wrong type this will be reported, as will any other loading errors. After loading is complete the tune will be played back to you. Note that any tune in memory will be overwritten when inputting another file in this way.

Spooling
As with the outputting a file option, you will be asked to name the tune. This is used in the procedure name as well as the filename. You are then prompted for the starting line number so you can avoid any clashing line numbers if it is to be added to another program. So you can create several tunes, each with it's own sound, you are also asked to give the envelope used in the procedure a number.

A procedure created in this way is entirely self-supporting and does not require additional program lines. The routine as spooled has a call to the procedure at the start to allow you to test it easily. This should be deleted and postioned anywhere in the main program when the routine is merged in.

```
340 IFINKEY-82PROCplay(c%):GOTO340
350 IFf1%=1PROCstore
360 IFINKEY-74PROCplay(g%+48):GOTO360
370 IFf1%=1PROCstore
380 IFINKEY-67PROCplay(D%):GOTO380
390 IFf1%=1PROCstore
400 IFINKEY-90PROCplay(G%+48):GOTO400
410 IFf1%=1PROCstore
420 IFINKEY-51PROCplay(d%):GOTO420
430 IFf1%=1PROCstore
440 IFINKEY-89PROCplay(f%+48):GOTO440
450 IFf1%=1PROCstore
460 IFINKEY-83PROCplay(E%):GOTO460
470 IFf1%=1PROCstore
480 IFINKEY-1PROCplay(F%+48):GOTO480
490 IFf1%=1PROCstore
500 IFINKEY-100PROCplay(F%):GOTO500
510 IFf1%=1PROCstore
520 IFINKEY-105PROCplay(E%+48):GOTO520
530 IFf1%=1PROCstore
540 IFINKEY-84PROCplay(f%):GOTO540
550 IFf1%=1PROCstore
560 IFINKEY-88PROCplay(d%+48):GOTO560
570 IFf1%=1PROCstore
580 IFINKEY-101PROCplay(G%):GOTO580
590 IFf1%=1PROCstore
600 IFINKEY-104PROCplay(D%+48):GOTO600
610 IFf1%=1PROCstore
620 IFINKEY-85PROCplay(g%):GOTO620
630 IFf1%=1PROCstore
640 IFINKEY-87PROCplay(c%+48):GOTO640
650 IFf1%=1PROCstore
660 IFINKEY-86PROCplay(A%):GOTO660
670 IFf1%=1PROCstore
680 IFINKEY-103PROCplay(C%+48):GOTO068
690 IFf1%=1PROCstore
700 IFINKEY-70PROCplay(a%):GOTO700
710 IFf1%=1PROCstore
720 IFINKEY-102PROCplay(B%):GOTO720
730 IFf1%=1PROCstore
740 IFINKEY-58PROCselectup:GOTO740
750 IFINKEY-42PROCselectdown:GOTO750
760 IFINKEY-36PROCtoggle
770 IFINKEY-34ANDq%>0PROCwipe
780 IFINKEY-17ANDq%>0PROCdelete
790 IFINKEY-56ANDq%>00%=1
800 IFINKEY-49ANDq%>00%=2
810 IFINKEY-53ANDq%>00%=3
820 IFINKEY-22ANDq%>00%=4
830 IFINKEY-390%=5
840 IFINKEY-19PROCcat
850 ENDPROC
860 DEFPROCwipe:PROCmark(8,1)
870 VDU28,0,23,39,22:CLS:*FX11,1
```

Turn to Page 120 ▶

Memory adjustment

The variable *KA%* near the start of the program sets the amount of memory available. This can be increased according to the initial setting of *PAGE* on your particular micro.

Educational use

A good educational use for this program is for a teacher to enter a tune with wrong timings and save it. The tune can then be loaded at any time and the pupil can step through it in the correct rhythm. In this way a measure of timing can be taught.

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Here is a selection from our range of public domain program discs. Send an S.A.E. for a full list.

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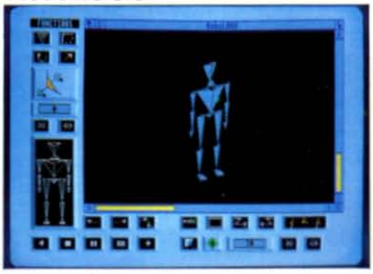

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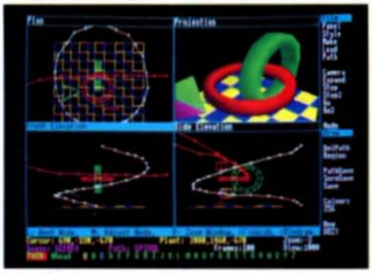

The package provides an interactive environment to create animated sequences of 3D scenes with dynamic camera motion for 'walk-throughs' and 'flight-paths' for objects within the scene. The fully graphical environment requires no programming or textual entry and the capability to calculate smooth shaded frames of complex scenes with lighting effects at rates of 60/minute allows fast interactive design of animated sequences. A large number of these frames can then be stored using built-in compression facilities to play-back at video scan rates for on-screen animation or video recording. Fully compatible with SolidCAD and SolidsRENDER, animation Oscars are now within your reach.

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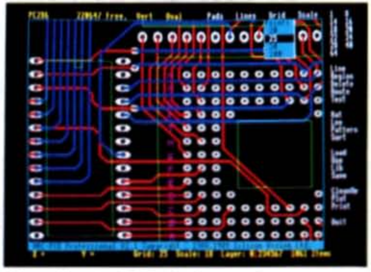

The ultimate PCB design package developed specifically for the Archimedes is now even better. ARC-PCB Professional follows on the success of the original and provides Faster & Improved Automatic Routing, Oval & Circular pads with fully variable sizes, Faster Redraw, Extended library part manipulation, & Instant Editing operations for substantially increased productivity. This Professional version operates orders of magnitude faster than the original and surpasses all other PC-based PCB design systems in features & speed of operation for the fastest turnaround from concept to finished board design. Take the lead for your PCB designs before your competitors do.

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"In summary, BASIC V is the best version of BASIC produced and RiscBASIC provides the most compatible, fastest compiler for this language. My congratulations to Silicon Vision" - Archive June 1989.

"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

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Spinning spectacular

Jim Burdus demonstrates an extremely dramatic animation technique

THE Beeb's Revenge program from our June issue demonstrated one excellent method of animation. Now here in full colour is another – the classic spinning ball. There are three ways of throwing fantastic graphics around the screen on an 8 bit BBC Micro and all of them involve hardware.

There's screen scrolling which is used in most games, screen switching – put to good effect in Rob Walmsley's Revenge – and palette switching.

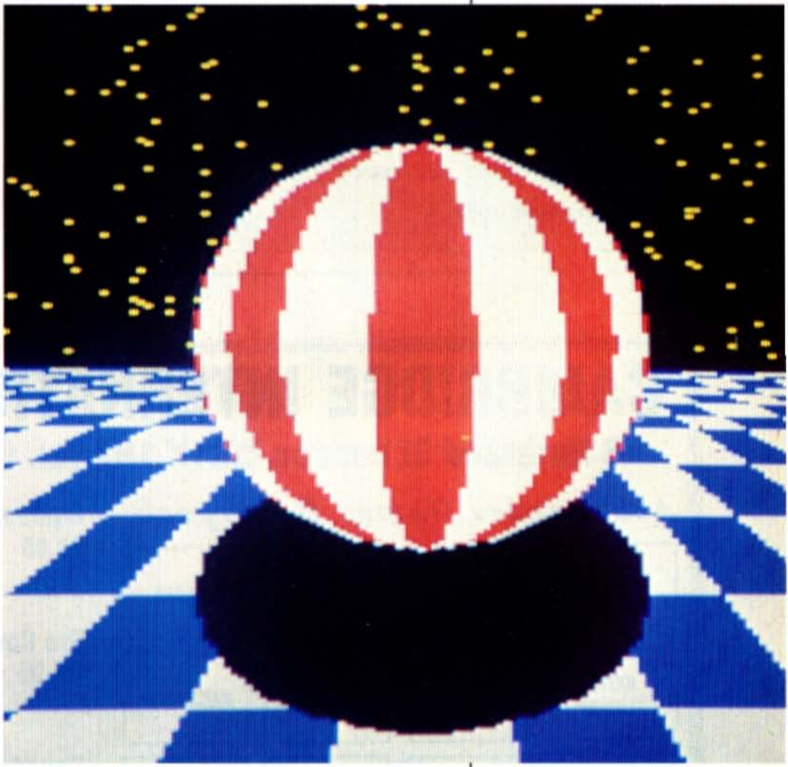
The third technique involves reprogramming the physical colour attached to one of the screen's logical colours in such a way that motion appears to take place. For the spinning ball, Mode 2 (16 colours) is used and eight logical colours but only two physical ones – red and white – are assigned to the ball. By sequentially altering the colours we can give the overall impression of the ball spinning.

The background is the same as the one used in Stuart Tyrell's Archimedes Bouncers modified because neither the BBC B or B+ have a rectangle fill routine. Instead a series of lines – filling the necessary area – are drawn using the appropriate GCOL effect.

Similarly, the two earlier machines don't have a filled ellipse drawing option so the routine from the January 1988 Library feature was modified and optimised for this particular application.

If you're using a Master, Compact or 32 bit machine you'll find machine-specific commands in REM statements to replace the more primitive versions, although it will work as shown on these micros.

So type it in exactly as shown – insert the alternate lines for your micro later if you want to – and ensure you've made no mistakes using the checksums, then run it. You'll be impressed with the result.



```
 10 REM > Spinner
 20 REM by Jim Burdus
 30 REM (c) The Micro User
 40 MODE2
 50 REM >> Archimedes series >>
 60 REM MODE12
 70 VDU23,1,0;0;0;0;0;
 80 VDU19,0,4;0;19,1,0;0;19,2,7;0;
 90 VDU19,3,0;0;19,4,1;0;19,5,1;0;
100 VDU19,6,1;0;19,7,1;0;19,8,7;0;
110 VDU19,9,7;0;19,10,7;0;19,11,7;0;
120 VDU19,12,3;0;
130 PROCbackground:PROCstars
140 y%=253:GCOL0,1
150 PROCell(640,200,y%,162):K%=-11
160 VDU29,0;0;24,640;0;1279;1023;
170 FOR x%=285 TO 0 STEP-SQR(285-x%)-1
  180 J%=7-SQR(285-x%)MOD8+4:GCOL 0,J%
  190 IF J%<>K% IF ABSx%>32 PROCell(640,
512,x%-32,y%)
  200 K%=J%:NEXT
  210 VDU29,0;0;24,0;0;640;1023;:K%=-1
  220 FOR x%=285 TO 0 STEP-SQR(285-x%)-1
  230 J%=SQR(285-x%)MOD8+4:GCOL 0,J%
  240 IF J%<>K% IF ABSx%>32 PROCell(640,
512,x%-32,y%)
  250 K%=J%:NEXT
  260 L%=0:B%=4:dir=1:spd%=5
  270 REPEAT:*FX19
  280 FOR C%=0 TO 7
  290 IF C%<4 VDU19,(C%+L%)MOD8+B%,1 ELS
E VDU19,(C%+L%)MOD8+B%,7
```

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```
  300 NEXT
  310 T%=TIME+spd%
  320 REPEAT UNTIL TIME>T%
  330 IF INKEY-122 dir=1
  340 IF INKEY-26 dir=-1
  350 IF INKEY-82 dir=0
  360 IF INKEY-58 IF spd%>0 spd%=spd%-1
  370 IF INKEY-42 IF spd%<40 spd%=spd%+1
  380 L%=(L%+dir)MOD8:IF L%=-1 L%=7
  390 UNTIL FALSE
  400 :
  410 DEFPROCbackground
  420 VDU 29,640;512;:GCOL0,2
  430 FOR X=-10000 TO 10000 STEP 400
  440 MOVE 0,100:MOVEX-100,-512
  450 PLOT 85,X+100,-512:NEXT:GCOL0,2
  460 PROCfill(-640,0,1280,512)
  470 Y=-8:YM=1.2:F=0:GCOL 3,2
  480 REPEAT F=NOTF
  490 IF F PROCfill(-640,Y,1280,Y*YM-Y)
  500 Y=Y*YM:UNTIL Y<-600:GCOL 0,1
  510 PROCfill(-640,-30,1280,512)
  520 VDU29,0;0;:ENDPROC
  530 :
  540 DEF PROCfill(X%,Y%,x%,y%)
  550 REM >> Master series >>
  560 REM MOVE X%,Y%:PLOT101,x%,y%:ENDPR
OC
  570 REM >> Archimedes series >>
  580 REM RECT.FILL X%,Y%,x%-X%,y%-Y%:EN
DPROC
  590 IF Y%>y% t%=y%:y%=Y%:Y%=t%
  600 FOR Q%=Y% TO y% STEP 4
  610 MOVE X%,Q%:DRAW x%,Q%:NEXT
  620 ENDPROC
  630 :
  640 DEF PROCstars:LOCAL L%
  650 GCOL 0,12:FOR L%=1 TO 250
  660 PLOT69,RND(1280)-1,RND(524)+500
  670 NEXT:VDU26,29,0;0;:ENDPROC
  680 :
  690 DEF PROCell(X%,Y%,M%,N%)
  700 REM >> Master series >>
  710 REM MOVE X%,Y%:MOVE X%+M%,Y%
  720 REM PLOT 205,X%,Y%+N%:ENDPROC
  730 REM >>.Archimedes series >>
  740 REM ELLIPSE FILL X%,Y%,M%,N%:ENDPR
OC
  750 LOCAL CA,SA,Ct,St,Ca,Sa,Cp,Sp
  760 LOCAL A%,x%,y%,S%,T%:S%=60
  770 Ct=COSRADT%:St=SINRADT%
  780 Ca=COSRAD(360/S%):Cp=1
  790 Sa=SINRAD(360/S%):Sp=0
  800 MOVE M%*Ct+X%,M%*St+Y%
  810 FOR A%=1 TO S%
  820 CA=Cp*Ca-Sp*Sa:SA=Sp*Ca+Cp*Sa
  830 x%=M%*Ct*CA-N%*St*SA+X%
  840 y%=M%*St*CA+N%*Ct*SA+Y%
  850 MOVE X%,Y%:PLOT 85,x%,y%
  860 Cp=CA:Sp=SA:NEXT:ENDPROC
```

Get it right!

```
 10 =    0 0 | 300 = 2C83 B | 590 = 3B39 4
 20 =    0 0 | 310 = CD5E C | 600 =  FA4 4
 30 =    0 0 | 320 = 64BD A | 610 = A40C E
 40 = DA59 9 | 330 =  633 E | 620 = ED0F D
 50 =    0 9 | 340 =  91E 6 | 630 = 9719 9
 60 =    0 9 | 350 = 71D4 6 | 640 = AE35 5
 70 = 8EF3 6 | 360 = 2455 B | 650 = F647 5
 80 =  639 E | 370 = 9CD9 D | 660 = 12EE 8
 90 = 6788 8 | 380 = A8FF 3 | 670 = FB59 F
100 = 6BA0 E | 390 = 226C 7 | 680 = 9719 6
110 = 684C 6 | 400 = 9719 8 | 690 = 8451 D
120 = B49A A | 410 = 88CF B | 700 =    0 D
130 = 61C2 4 | 420 = 47F0 2 | 710 =    0 D
140 = D14A 5 | 430 = C8A6 1 | 720 =    0 D
150 = 65D9 D | 440 = 87F0 1 | 730 =    0 D
160 = 4AF7 1 | 450 = 924E C | 740 =    0 D
170 = AD7E 7 | 460 = 3D4D A | 750 = BA82 1
180 =  610 4 | 470 = EB67 6 | 760 = F472 F
190 = 4975 B | 480 = 64E9 8 | 770 = 1AFC A
200 = 6082 7 | 490 = 747C C | 780 = 6ADC 9
210 =  DBF 3 | 500 = 8BD8 9 | 790 = FF9F 7
220 = AD7E 4 | 510 = 56AD 3 | 800 =  26C F
230 = D64A E | 520 = 39CE 3 | 810 = AD3E D
240 = 4975 4 | 530 = 9719 2 | 820 = 6AB3 4
250 = 6082 8 | 540 = 6D64 B | 830 = 148E 4
260 = 9B86 1 | 550 =    0 B | 840 = 6A3F A
270 = 9E1F F | 560 =    0 B | 850 = ADC0 D
280 = DD87 3 | 570 =    0 B | 860 = 322C 7
290 = 4EC4 0 | 580 =    0 B |
```

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HELP!

Edward Moran reveals how you can make your micro do the walking

MICROS are complicated things. There are many commands to remember and the numbers increase as the machine is expanded. Things aren't made any easier by the fact that many "easy to use" programs are not as user-friendly as the manufacturer would have us believe.

This complexity results in either trial and error tests or time-consuming manual use. It's time, perhaps, for Helper – a machine code program for use with sideways ram. It has only two commands – *H and *HI.

Helper's job is to display text information previously entered by you on the screen. It could be excerpts from a program's manual, short descriptions of commands or even lists of addresses.

The text for display can be created on any word processor using a particular format to make Helper easier to use. The text files are split using titles placed at the start of each section. They are prefixed with either the { or } character to enable Helper to pick out titles and finish with Return. Helper assumes all text following the title is to be associated with it until the next {, } or the end of the file. In Mode 7 { becomes a quarter sign and } is three-quarters. Here is an example:

```
{RUN
Runs a BASIC Program.
{LOAD
```

HELPER will associate the text *Runs a BASIC Program* with the title RUN.

When creating the text file you should make it as close to pure Ascii as possible, so in View use the WRITE command instead of SAVE. Although as Helper has no formatting facilities in View set up a ruler to match the width of whatever screen mode the text is likely to be displayed in.

Once you have written your text file, it is simply a matter of appending it on to the end of the machine code program using the listing. Enter it and use the checksums to ensure you've made no typing errors. Then save and lock it.

On running, it requests a help text filename. If the file itself is too long a message tells you how many bytes too big it is and asks for another filename. A file of the right length is loaded. When asked for a save filename enter one not more than seven characters long and press Return. The program now prompts for the go ahead. Press Y if everything is OK and N if you wish to start again. The complete Helper file is now saved to disc. Pressing Escape at any point will produce a prompt asking if you wish to re-run the program.

Now you have a Helper on the disc. Load it in using whatever method you normally use for your sideways ram, some possibilities are:

```
*LOAD B_Help 8000
*SRLOAD B_Help 8000 7
*SRLOAD B_HELP 8000 X Q I
```

Then – if you're not using a Compact – press Break or Control+Break to initialise the roms. For the Compact you can add an I to the end of the SRLOAD command to force the rom image to be initialised without any further action. Helper is now resident in your micro. You can check it by typing *HELP and, along with other messages, you should get:

```
HELPER
*H <Return> for index
```

Typing *H will list all the titles you entered

Turn to Page 82 ▶

> “It is simply a matter of appending your text file on to the end of the machine code, using the listing”

```
>*H vectors

Name        Address     Description/OS routine
--------------------------------------------------
UPTV        222         User print routine
EVNTV       220         Event interrupt
FSCV        21E         File system control entry
FINDV       21C            OSFIND
GBPBV       21A            OSGBPB
BPUTV       218            OSBPUT
BGETV       216            OSBGET
ARGSV       214            OSARGS
FILEV       212            OSFILE
RDCHV       210            OSRDCH
WRCHV       20E            OSWRCH
WORDV       20C            OSWORD
BYTEV       20A            OSBYTE
CLIV        208            OSCLI
IRQ2V       206         Unrecognised IRQ vector
IRQ1V       204         All IRQ vector
USERV       200         Reserved
```

◄ *From Page 81*

prefixed with } while *HI will list all the titles starting with }.

You can use Control+N before typing the command to enter the screen paging mode – use Shift to scroll and turn it off with Control+O.

Enter *H followed by a space and one of the titles from the index to get the help text.

So that's the Helper. It is quite useful as it stands, although improvements could include loading the Help files directly into sideways ram, eliminating the creator program. A global search facility and formatting for the correct mode could also be useful.

If you think you will use it enough, a Helper image can be blown into an eprom and kept in the machine permanently although having battery-backed sideways ram would be more flexible.

Its uses are not just limited to help files: The text could be your most used addresses and could be called up simply by typing:

```
*H name of firm/person
```

where the name of firm/person is the title given to that address.

And how about a Helper solo adventure game? Or a Helper disc or games catalogue? If you have an unusual use for the Helper tell us about it.

All program listings in this issue can be downloaded FREE on ...
MicroLink

```
   10 REM The HELP ROM
   20 REM by Edward Moran
   30 REM (c) The Micro User
   40 :
   50 ONERROR GOTO2360
   60 MODE7:PROCinit:PROCheader:PROCassm
   70 PROCfile:PROCsave:END
   80 :
   90 DEFPROCinit:z=&70
  100 OSASCI=&FFE3:OSNEWL=&FFE7
  110 OSARGS=&FFDA
  120 call=&9A:s=&9B:tY=&9C
  130 cY=&9D:ind_text=&9E:temp=&F0
  140 ENDPROC
  150 :
  160 DEFPROCassm
  170 FOR pass=4 TO 6 STEP 2
  180 P%=&8000:O%=&3000
  190 [OPT pass
  200 \
  210 \ ROM header coding...
  220 \
  230 EQUB 0
  240 EQUW 0
  250 JMP service
  260 EQUB &82
  270 EQUB copy_offset
  280 EQUB 1
  290 .title
  300 EQUS "HELPER"
  310 EQUB 0
  320 .copy_offset
  330 EQUB0
  340 EQUS "(C) E Moran 1988"
  350 \
  360 \ Service code
  370 \
  380 .service
  390 STA call
  400 TXA:PHA
  410 TYA:PHA
  420 LDA call
  430 CMP#4:BEQ command
  440 CMP#9:BEQ help
  450 JMP notserviced
  460 \
  470 \ *HELP code
  480 \
  490 .help
  500 JSR OSNEWL
  510 .printname
  520 LDX #0
  530 .titleloop
  540 LDA title,X
  550 BEQ exittitle
  560 JSR OSASCI
  570 INX
  580 JMP titleloop
  590 .exittitle
  600 JSR OSNEWL
  610 LDX #0
  620 .help_text
  630 LDA info,X
  640 BMI exit_help
  650 JSR OSASCI
  660 INX
  670 JMP help_text
  680 .exit_help
  690 JMP notserviced
  700 \
  710 \ Commandline interpreter
  720 \
  730 .command
  740 LDA (&F2),Y:ORA #32
  750 CMP #ASC"h":BNE notserviced
  760 INY:LDA(&F2),Y:ORA #32
  770 CMP #45:BEQ direct
  780 CMP #ASC" ":BEQ specific
  790 CMP #ASC"i":BEQ indirect
  800 \
  810 \ Serviced and not serviced
  820 \
  830 .notserviced
  840 PLA:TAY
  850 PLA:TAX
  860 LDA call
  870 RTS
  880 .serviced
  890 PLA:TAY
  900 PLA:TAX
  910 LDA #0
  920 RTS
  930 \
  940 \ Subroutines for commands
  950 \
  960 .indirect LDA #ASC"}":STA s:JMP Li
st
  970 .specific JMP Title
  980 .direct LDA #ASC"{":STA s:JMP List
  990 \
 1000 \ *I for Index code
 1010 \
 1020 .List
 1030 JSR header:LDX#0
 1040 JSR set_ind:LDY#0
 1050 .loop1
 1060 LDA (ind_text),Y
 1070 CMP s:BEQ setflag
 1080 CMP #13:BEQ unsetflag
 1090 CMP #255:BEQ out
 1100 CPX #1:BEQ print
 1110 .ret_list
 1120 JSR inc2
 1130 JMP loop1
 1140 \
 1150 .out
 1160 JSR OSNEWL:LDX#0
 1170 .loop2
 1180 LDA mess,X:BMI serviced
 1190 JSR OSASCI:INX
 1200 JMP loop2
 1210 \
 1220 .setflag
 1230 LDX#1:JMP ret_list
 1240 \
 1250 .unsetflag
 1260 CPX #1:BNE unset:JSR OSNEWL
 1270 .unset LDX#0:JMP ret_list
 1280 \
 1290 .print
 1300 JSR OSASCI:JMP ret_list
 1310 \
 1320 .header LDX#0
 1330 .loop3 LDA head,X:BMI outhead
 1340 JSR OSASCI:INX
 1350 JMP loop3
 1360 .outhead RTS
 1370 \
 1380 .set_ind
 1390 LDA #text MOD 256::STA ind_text
 1400 LDA #(text+1) DIV 256:STA ind_text
+1
 1410 RTS
 1420 \
 1430 \ *Title specific code
 1440 \
 1450 .Title
 1460 JSR set_ind:JSR strip
 1470 STY call:LDX#0
 1480 .resetY LDY call
 1490 JSR textY:.loop4
 1500 LDA (ind_text),Y:CMP #ASC"{"
 1510 BEQ cont:CMP #ASC"}"
 1520 BEQ cont:CMP #255:BEQ noluck
 1530 JSR inc2:JMP loop4
 1540 .cont
 1550 JSR comY:JSR inc2:LDA (&F2),Y
 1560 ORA #32:STA temp:JSR textY
 1570 LDA (ind_text),Y:ORA #32
 1580 CMP temp:BNE resetY
 1590 CMP #45:BEQ print2
 1600 JSR comY:INY:JSR textY
 1610 JMP cont
 1620 \
 1630 .inc2
 1640 INC ind_text:BEQ more:RTS
 1650 .more INC ind_text+1
```

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PINEAPPLE SOFTWARE

PCB DESIGNER

PCB is a powerful Rom based printed circuit board design program suitable for all BBC computers. Its fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input routine and allows any component to be 'picked up' and moved around the board without having to respecify component interconnections. The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB auto-route is remarkable. No similar software comes near the price.'–ACORN USER, Aug. '88.

'Although it appears expensive, there is nothing else remotely similar, even on other micros for less.'–BEEBUG, April '88.

PCB Manual Track Routing	£85.00
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PCB Plotter Driver	£35.00

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IBM PCB DESIGNERS

EASY-PC EASY-PC is a powerful PCB design program combined with a schematic drawing package. Up to 8 board layers plus upper and lower silk screens. Board size up to 17"x17". Powerful zoom and pan features. Suitable for IBM PC/XT/AT & compatibles with 512k Ram.

EASY-PC	£98.00

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PCB TURBO V2 Unbeatable full feature auto-routing IBM PCB designer. Boards up to 32" x 32" with 6 layers. Output to pen plotter, photoplotter, dot-matrix printer or laser printer. Minimum requirements: IBM XT/AT compatible (286 or 386 processor) with 640k Ram and 10mb hard disc. CGA, EGA or VGA colour graphics adapter.

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New 1000 series plotters at unbeatable prices! All with A3 paper handling 8 pens and 420mm/sec plotting speed. Parallel and serial interfaces and soft pen landing with automatic origin setting on all models. 1200 model has addition of electrostatic paper hold and X-Y coordinate display. 1300 model also has manual pen speed adjustment and a 1Mb buffer.

DXY 1100	£625.00
DXY 1200	£865.00
DXY 1300	£1125.00

P&P £10.00

Please add 15% VAT to all prices

HOME ACCOUNTS

A brand new program from Pineapple offering the simplest solution to keeping track of all your home accounts. The program is unbelievably simple to use but still offers all the essential features such as automatic standing order handling, statement reconciliation etc. Any number of accounts may be stored on disc and transfers between accounts requires only a single operation. Available for Model 'B', Master and Compact with disc drive.

Home Accounts	£19.95	P&P Free

MODE 7 Teletext Editor

This new program from Pineapple is ideal for quickly designing those MODE 7 screens without having to draw everything out first on graph paper! It includes line drawing and filling routines as well as circles and ellipses. Up to ten screens may be stored in memory at any time and many others may be saved and retrieved from disc. A basic converter routine enables any screen that is created to be converted into a procedure for use in a Basic program. Another powerful feature is the ability to produce a 'Carousel' output. This will enable a continuous display of any number of screens in any sequence to be displayed at a predetermined rate for shop window displays etc.

Teletext Editor	£19.00	P&P Free

ADFS Utilities Rom

ADU is an invaluable utility for all ADFS users. It adds over 22 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more. Transferring of files from DFS to ADFS is also made very easy with *DFSADFS.

ADU	£29.00	P&P Free

MARCONI TRACKERBALLS

We now have an adapter available to link the trackerball to the Archimedes, to enable it to directly replace the Archimedes mouse.

Bare Trackerball (no software)	£45.00	For Model 'B' and 'B+' (with Icon Artmaster)	£59.00
For Master 128 (with Pointer Rom)	£59.00	Pointer Rom for Master 128	£12.50
Adapters to drive BBC Mouse software	£8.00	Archimedes Adapter	£19.95

Trackerballs also available for other computers, please 'phone for details P&P on Trackerballs £1.75

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Three very powerful circuit analysis packages. Miteyspice is available for the BBC range of computers, and Spice.Age and ECA-2 for the IBM and compatibles. Spice.Age is a new product for the IBM range which provides facilities for transient and Fourier analysis as well as D.C. and Freq. response performance.

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ECA-2 (IBM PC/XT/AT 256k Ram)	£675.00	LCA-1 (Logic Analyser for IBM's)	£450.00

P&P Free

Please address all enquiries to:
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V1.2 RISC OS ONLY

4GL

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. . . everyone will program this way one day"

ARCHWAY 4GL lets YOU unleash the huge program power of RISC OS and the ARM easily and quickly. Build powerful multi-window applications with pop-up menus, icons, mouse control, etc. of a professional quality. Programs are fully RISC OS multi-tasking and appear on the icon bar. All using BBC BASIC.

ARCHWAY 4GL provides a total environment for program creation including **tools, shell** program with **run-time** code, extensive **examples** and a **library** of functions and procedures.

The family of **tools** runs from a single, multi-tasking main menu. Individual tools let you create multi-level menus, define and edit a wide range of window types, icons, mouse pointers and much more. **ARCHWAY 4GL** tools are extremely powerful but easy to use with cut, copy and paste, undo, on-line help at every step, and hard copy print-out facilities.

The **shell** is a ready-to-run RISC OS application in line with Acorn's guidelines. The shell uses a large body of **run-time** code. The run-time automatically handles windows, menus, icons, etc. so detailed knowledge of the WIMP manager is not needed. You extend and fine-tune the shell by adding menus and windows using the tools, and writing functions and procedures to carry out the tasks of your application.

An in-depth user guide takes you gently step-by-step through a progressive series of some 50 program building sessions from complete beginner to advanced level. All examples are on disc ready to run.

The complete system (V1.2) comes on 4*800k discs with a 500-page ring bound user guide. You need an Archimedes or A3000 with 1M or more of RAM and fitted with RISC OS. One disc drive is sufficient. There is no extra licence fee to distribute copies of the run-time in your programmes.

Cheques/POs/official orders or Access/Visa number and expiry date. 24-hour 'phone for Credit Card orders.

★ Create a new, ready-to run shell application from the tools menu by a simple RISC OS file save operation. Now double-click SELECT on your new application. It loads and appears on the iconbar. Click MENU on its iconbar sprite. A menu with the standard 'Info' and 'Quit' items pops up. Click SELECT on the sprite and a main window appears complete with its own menu. This is your starting point.

★ Handle menus automatically with the run-time. Call BASIC functions direct from menus. Pop-up windows direct from menus. Chain menus together. Set-up menu fonts and colours. Shade and tick menu items. Accept user input into BASIC variables with writeable menu items.

★ Handle standard window types almost automatically with the run-time. eg warning messages, scrolling lists, displaying '!Edit', '!Paint' and '!Draw' files, file saving, window printing, radio button sets, etc.

★ Set-up the contents of more complex windows visually with WYSIWYG editors.

★ Place icons in windows to provide powerful but easy-to-program facilities. Pop-up menus from icons. Call BASIC functions direct from icons. Accept user input into BASIC variables with writeable icons. Display the contents of BASIC variables in icons.

★ Create a stack of windows easily from a single window. Ideal for databases, presentations, etc.

★ Re-use windows, menus, etc from existing **ARCHWAY** applications by using the librarian tool to drag copies into your application.

"You get an excellent piece of software which will make the mountain of programming needed to operate the WIMP environment into a molehill". "...you can create a complex WIMP environment very quickly ... I have had no end of use out of this easy-to-use package . . ." —Archive, July 1989

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PLUS . . . PLUS . . . PLUS . . .

In addition to the above offer, we are giving away completely FREE OF CHARGE, 12 months subscription to the most informative Archimedes specialist magazine, ARCHIVE.

Desk Top Publisher

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With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

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P.S. The 310 upgrade requires a backplane and a fan.

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Watford Electronics are the largest Z88 Dealer in the UK

Only: **£195** (Carr £4)

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

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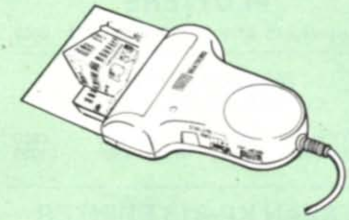
NEW

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system. The package includes the most comprehensive utility software available for the Archimedes, a high quality, ergonomically designed to fit the shape of your hand, (see drawing above) scanner, which is fitted with a warning LED that will indicate if the scanner is being moved too quickly for accurate results. Additional twin guide rollers ensure precise tracking over the image, to make the best use of the high resolution available with this sytem. The yellow/amber illumination of our Mk II scanner, enables you to achieve optimum accuracy.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multitasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are:

Cropping and scaling to any size including stretching and squashing in X and Y directions separately.

Colour tinting.

X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying whch allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscaped modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

Launch offer £149
(P&P £4)

NEW

Archi Graphic Tablet

This package allows Archimedes users to take advantage of the low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this port itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics table as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tabler's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be remapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

Launch Price £259
(Price includes Tablet, leads and software)
(P&P £4)

Archimedes Real-Time Digitiser

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £249

A Set of Colour Filters for colour image grabbing using a video camera	£16

Continued→ → → → → → → → →

MONITORS

MICROVITEC 14"

● **1431** – Standard resolution as used on the BBC television computer programme	£175
● **1451** – Medium resolution, suitable for word processing in mode 0	£219
● **1441** – High res, exceeds the capabilities of the BBC Micro	£359
● **1431AP** RGB + PAL and AUDIO	£199
● **1451AP** RGB + PAL and AUDIO	£255
● **2030 CS** 20" Med Res	£399
● **2040 CS** 20" Hi Res	£675
● Dust Cover for Microvitecs	£5.50
● **Touchtec 501 Touch Screen**	£239

14" MULTISCAN COLOUR

● **TAXAN** Multisync 770 Plus	£415
● **TAXAN** Multiscan 870 16" Monitor	£575
● **TAXAN** Viking 19" Paper White, High Resolution (1152 x 896 with Archi 400 series)	£799
● **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89	£429
● **EIZO** 9060S Super High resolution multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch	£469

TAXAN 12"

● Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch	£269

PHILIPS

● **BM7502** 12" Hi-res Green Monitor	£64
● **BM7522** 12" Hi-res Amber Monitor	£68
● **CM8833** 14" Med. Res Colour Monitor	£195

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £189

Dust Cover for Philips Monitors	£6

(Securicor carriage on Monitors £7)

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)

for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

Price £12

CONCEPT KEYBOARDS

Standard A3 for BBC	£135
Standard A4 for BBC	£103

PLOTTERS

● Plotmate A4S	**£379**	● Plotmate A3M	**£549**

Roland Plotters

(Official Roland Appointed Distributor)

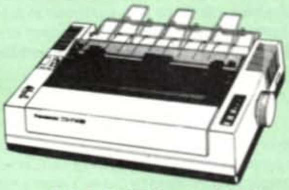
● **DXY 880A**	£560	● **DXY 1100**	£630
● **DXY 1200**	£879	● **DXY 1300**	£1035

TAXAN KP-815 PRINTER

Offer Price £149

RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

Panasonic KX-P1081



SALE OFFER only: **£135**

(Price includes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us)

KS-P1180 Printer Offer

Panasonic KX-P1180 printer, Dump Out 3, Screen Dump ROM & a BBC printer lead.

Offer Price £146

Panasonic Printers

● **KX-P1124** 24pin 80col. 192/63 CPS	£245
● **KX-P1180** 9pin 80col. 144/38 CPS	£146
● **KX-P1540** 24pin 136col. 240/80 CPS	£435
● **KX-P1592** 9pin 136col. 216/45 CPS	£275
● **KX-P1595** 9pin 136col. 288/61 CPS	£355

● **Panasonic KX-P4450** LASER PRINTER Latest technology at Watford's special offer price **£1,349**

● Spare Toner	**£29**	● A4 Feeder	£55
● Drum Unit	**£149**	● Developer	£115
● 1MB RAM Board			£299

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£185
KX-P1124 (P36)	£88	KX-P1180 (P37)	£79

BUFFERS

P12 4K buffer Board for 1081	£55
P42 32K buffer Chip for 1592/1595	£25
P43 32K Buffer Chip for 1540/1124	£25

Serial Interfaces

P17 P1081/1592	£32	P19 P1124/1180	£55

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595	£8
P115 for KX-P1180	£8
P145 for KX-P1124	£8
P140 for KX-P1540	£10
Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red	£9.95 each

INTEGREX COLOUR JET

● Colour Jet 132 Printer	£515
● Paper Roll	£6.50
● Screen Dump Software	£10
● Colour Cartridge	£16.50
● Black Cartridge	£10.35
● 100 A4 OHP transparencies	£55
● 8K Serial Interface Optional	£123
NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer	£2,695

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£249

Pinwriter Serial Interface (optional)	£55
P2200 Cut Sheet Feeder	£59
Additional Font Cartridge	£25
P2200 P2200 Spare Ribbon	£6
P2200 Dust Cover	£5

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	£439	**NEC P7+** 136 columns	£575
Colour Option	£74	Serial Interface	£73
Cut Sheet Feeder	£125		
NEC Ribbons for		P6 £8;	P7 £9.50

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

Star Printers

Star LC10	£139	LC10 Colour	£179
Star LC24-10	£205	XB24-10 Colour	£425
NB24-10	£425		
LC10 Colour Ribbon			£6
XB24-10 Colour Kit			£24
Cut Sheet Feeder			£65

EPSON PRINTERS

EX800	£410	LQ850	£405
EX1000	£564	LQ550	£259
FX850	£310	LQ860 Colour	£539
FX1000	£425	LQ1050	£549
FX1050	£395	LQ1060	£679
FX1060	£679	LQ2550+	£895
LQ550	£245	LX400	£139
GQ3500 Laser	£1150	SQ2500	£899

CUT SHEET FEEDERS for

EX800 **£149;** FX800/LQ800 **£149;** FX850/LQ850 **£149;** FX1000/LQ1000 **£179;** LQ500/LX800 **£79;** LQ1050 **£175;** LQ2550 **£390.**

TRACTOR FEED for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

ACCESSORIES

● EX800/1000 Colour Option	£55
● EX800/1000 Colour Ribbon	£18
● LQ2500 Colour Option	£65

(Securicor Carriage on Printers £7)

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 metre	£6
Nimbus Centronics Lead	£12
IBM Parallel Lead 1 metre	£6
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.

Listing Paper (Perforated)

● 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
● 2,000 Sheets 9.5" x 11" Fanfold Paper	£11
● 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" x 11" Fanfold Paper	£9
● 1,000 Sheets true A4 Fanfold Paper 70gms	£11
● 2,000 Sheets true A4 Fanfold Paper 70gms	£19
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

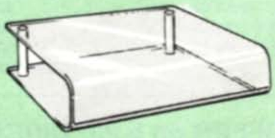
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£5.00
1,000 90 x 36mm (Twin Row)	£4.90
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

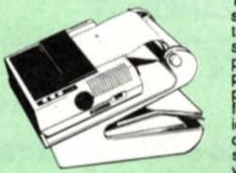
Perspex Printer Stand



Give you Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

80 Column version	£16 (carr £3)
136 Column version	£20 (carr £4)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and refold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

80 Column version £23 (carr. £3)
132 Column version £26 (carr. £4)

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	**Ribbons**	**Dust Covers**
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£3.95	£4.50
RX/FX80/MX80	£3.00	–
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	–
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£5.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changer

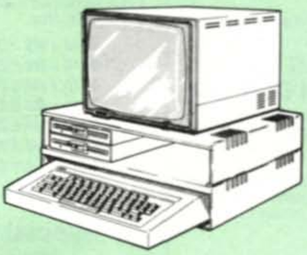
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	**Serial**	**Centronics**	**P&P**
2 to 1	£20	£22	£3
3 to 1	£27	£30	£3
5 to 1	£36	£39	£4

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



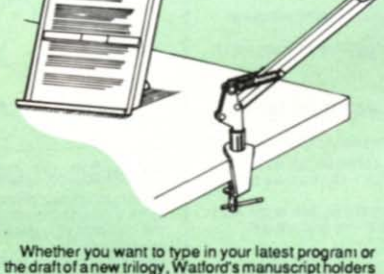
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Printer Plinth	420 x 310 x 105mm	**£12**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding you paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	**£20**
Compact AB Switch RS232	**£19**

(Cables extra at £6 each)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- ● Improves efficiency by making more efficient use of computer and printer.
- ● Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- ● Total compatiblity with all software.
- ● Cheaper phone bills when using your Modems.
- ● Ideal for those doing large graphics screen dumps that are slow to print.
- ● Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- ● Data Dump facility is included.
- ● Built in text unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you are with all sorts of printouts to show its capabilites – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

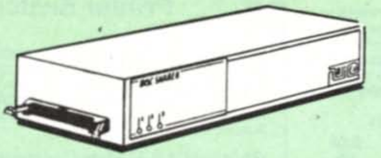
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued→ → → → → → → → → →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price : £65 — Price includes 3 Cables

NOW WITH EXTRA FEATURES
AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS), (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

● *Watford's sophisticated DFS ROM only*	£16
● *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only*	£12
● *DFS Manual (Comprehensive)*	*(no VAT)* £6.95

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs)

- *DNFS ROM only* £17 ● *ADFS ROM only* ***£25***

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770
Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00.**

● SPECIAL PRICE	£44.00
● DDFS Manual	(No VAT) £6.95
● We will exchange your existing DFS Kit for our sophisticated DDFS for only	£25.00

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.25** Twin CD (with PSU) **£3.90**

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

● *10 x 5.25" S/S D/D 40 Track Diskettes (744)*	***£6***
● *10 x 5.25" D/S D/D 40 Track Diskettes (745)*	***£7***
● *10 x 5.25" S/S D/D 80 Track Diskettes (746)*	***£9***
● *10 x 5.25" D/S D/D 80 Track Diskettes (747)*	***£9***
● *10 x 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT*	***£14***
● *10 x 3.25" S/S D/D 40/80 Track Discs*	***£10***
● *10 x 3.25" S/S D/D 40/80 Track Discs*	***£11***
● *10 x 3.5" High Density Diskettes*	***£25***

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 x **M3** 3.5" D/S D/D 80 Track Discs*	***£10***
● *10 x **M9** 3.5" Double Side High Density*	***£25***
● *10 x **M4** 5.25" S/S D/D 40 Track Discs*	***£5***
● *10 x **M5** 5.25" D/S D/D 40 Track Discs*	***£7***
● *10 x **M7** 5.25" D/S D/D 80 Track Discs*	***£9***
● *10 x **M8** 5.25" D/S H/D Hi-Density Discs*	***£14***
● *3" Double Sided Discs*	***£2.50 each***

Special BULK OFFER on 5.25" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£30	£35	£40
● With Sleeves	£33	£38	£43

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

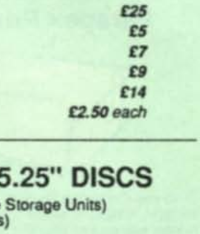
Price £4

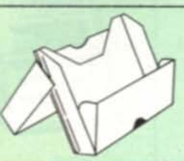
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

● **M35** – holds up to 50 5.25" discs	£4.95
● **M85** – holds up to 95 5.25" discs	£6.95
● **M25*** – holds up to 25 3.5" discs	£4.95
● **M50** – holds 50 3.5" discs	£6.50
● **M10** – holds 8 of No. 10 Data Cartridges	**£15**

* Not lockable





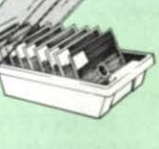
PLASTIC LIBRARY CASES

Holds up to 10 5.25" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the harzards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.



Protection at Only: **£2**

DISC ALBUMS

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket. £4

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with an Utilities Disc.

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high qulity NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

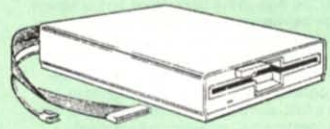
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

*Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges.** We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £18. (At Watford we anticipate your needs of tomorrow, not just today!)*

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 4th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD400 £168	CS 400S £85	CD400 £188
800K (1,44M		CLD 800S £153		CD 800S £163
● TWIN Disc Drive Case, complete with Power Supply & Cables **£43** **Securicor carriage on Disc Drives £6 to £7**				

Prefix ***C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

Suffix ***S** = 40-80 Switchable*

e.g. *CLS400S = Cased Disc Drive, Less power supply unit, single 5.25" 400K, (720K in double density); Double sided; 40/80 track switchable.*

Cable to connect 5.25" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer

- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3.5" DISC DRIVE OFFER

These top quality 3.5" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Drives to connect to BBC Micros own PSU

- **CLS35 400K Unit £69**
- **CLD35 Twin 800K £125**

Drives with built-in Power Supply Unit

- **CS35 Single 400K £85**
- **CD35 Twin 800K £135**

(P.S. CS35 Single is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage).

WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

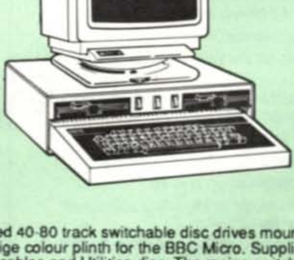
Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBC B (with 17 X disc interface).

● 30 Megabyte BBC Hard Disc **£369** (carr £9)

CDPM 800S

DP35-800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC B & Master £179

A Double disc drive with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master series is the 5.25" disk, the standard of the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S. It contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800S for BBC/Master £165

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued→ → → → → → → → →

QUEST
MOUSE Mk II

Quest Mouse II & Quest Paint	£58
Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
Quest Mouse II only	£29
Quest Paint Software only	£34
Quest Font Disc	£15
Quest Mouse Mat (Red or Blue or Green please specify)	£3
Part Exchange your unreliable AMX Mouse for a Quest Mouse for only	£22
GXR ROM for the BBC Micro (P.S. Quest Paint is not compatible with BBC Compact)	£22

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced and powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

NEW

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£52

THE NEW Mk III AMX MOUSE

Inc. Super Art package

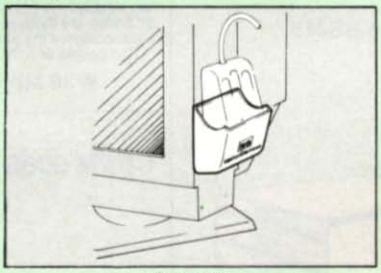
ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk. It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.



Price £4

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.
This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.
Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.
Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional ★ commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.
A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image. Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price Includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Magazine Maker
(As seen on TV)

A combination of Stop Press and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in Wordwise and View files plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

The WAPPING EDITOR

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module is a mode 0 version of the highly acclaimed Quest Paint package, detailed elsewhere in our advert, and incorporates all the same drawing facilities, e.g. pencil, brush, airbrush, polygon, circle, ellipse, fill, cut-and-paste, etc., etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

THE FONT EDITOR

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Upgrading to the Wapping Editor could not be easier since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format and a mode conversion utility will convert any screen in modes 1, 2, 4 or 5 into a full grey-scale mode 0 screen. Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independantly or from within the Wapping Editor package.

For convenience all types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, dispensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistication with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack	£69
Wapping Editor plus Mouse	£89

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

NEW

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

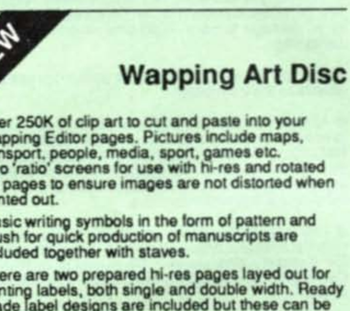
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan
Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

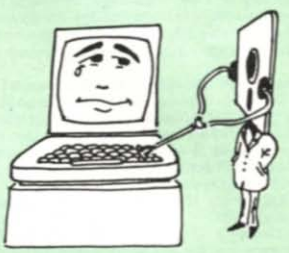
NEW

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

(Only suitable for BBC B with 8271 DFS)

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms see the feature in our advert.

NEW

Beeb DOS 2.2

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual.

Price: £39

(Please write in for technical literature)

Continued→ → → → → → → → →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as th printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £2)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	£36
	Aries B-12C	£5

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

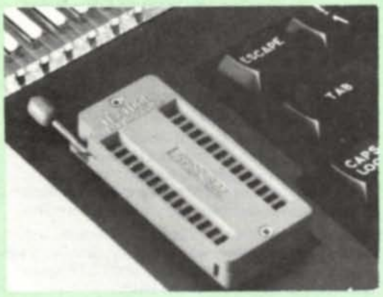
VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£26

Delta Base B

Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	£11
● Spare Cartridges	£2.50
● Spare Rack	£1.50

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8;** Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.

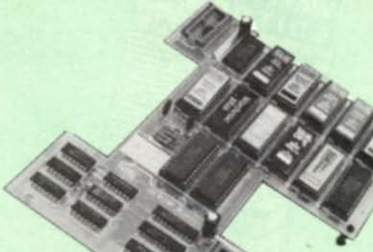
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for profressional software development.
- Supplied with utilities software disc.

Only: **£32** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

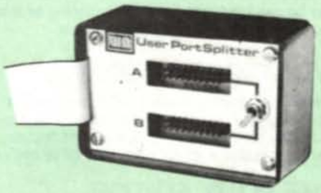
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16 Sideways RAM **£9**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

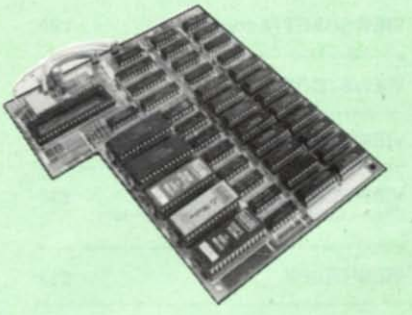
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 6 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

ROM/RAM card with 32k dynamic RAM	£48
ROM/RAM card with 64k dynamic RAM	£65
ROM/RAM card with a massive 128k dynamic RAM	£109

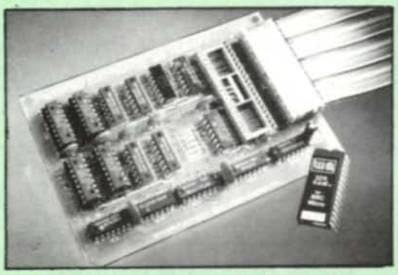
(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

16k plug-in Static RAM kit	£9
16k Dynamic RAM for Upgrade	£13
Battery backup	£3
Read and Write protect switches	£2 each
Complete ROM-RAM board All options installed	£115

P.S.
IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.

- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £2)
(Price includes a comprehensive manual
and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32k SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (Carr £2)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms. See the feature in our advert.

BBC SOFTWARE'S Popular Educational Software

Maths with a Story 1 (Disc). 4 primary level maths programs	£11.25
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PERIOD TABLE SOFTWARE	£20.00
Astronomy – Primary (Disc)	£12.00
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Espana Viva – 3 Discs	£19.95
A Vous La France Disc	£21.50

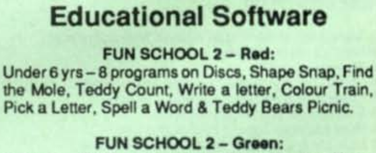
Educational Software

FUN SCHOOL 2 – Red:
Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic.

FUN SCHOOL 2 – Green:
6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump **£11.00**

FUN SCHOOL 2 – Blue:
Over 8 yrs – Eight programs on Disc, Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. **£11.25**

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued→ → → → → → → → →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

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MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

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All Prices Exclusive of VAT

MINI OFFICE II

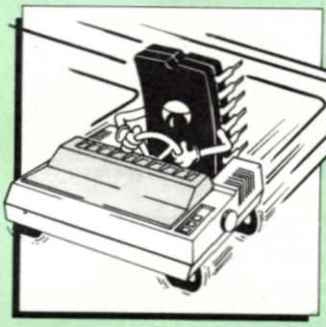
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
DISC Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

Advanced Computer Products

Advanced Disc Toolkit	£30
Advanced Disc Investigator	£25
Advanced 1770 DFS BBC	£29
Advanced 1770 DFS Master	£30
Advanced File Manager	£25
Advanced Control Panel	£30

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing at only a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
VIEWSHEET (Acornsoft)	**£36**
VIEWSTORE	**£36**
VIEWSPELL with 80 track disc	**£29**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£20**
VIEW-INDEX	**£12**
OVERVIEW packs 1 & 2	**£69**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

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STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

BEEBPLOT – Provides visual representation from Spreadsheet data.

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6502 Development Package	£7.50
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Carriage on Books vary between £1 to £3.50, depending on their weight.

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The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating system
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
A worthwhile addition to any Master owner's library.

All this for just £17 (NO VAT)

NEW

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

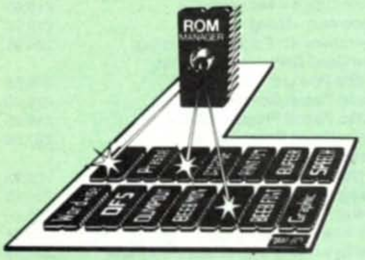
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Continued→ → → → → → → → →

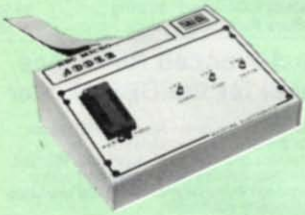
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs . Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs!
The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
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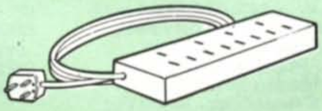

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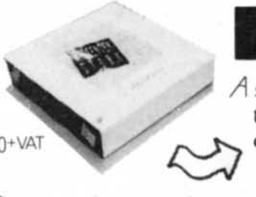

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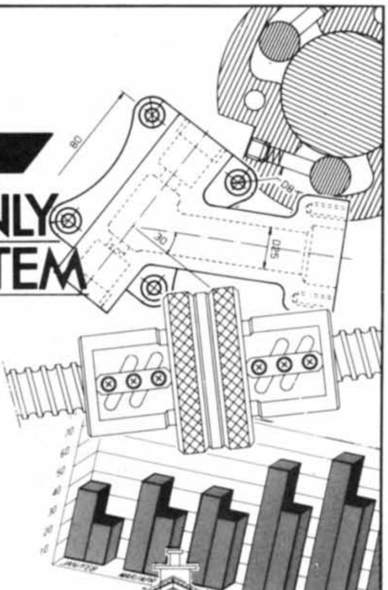

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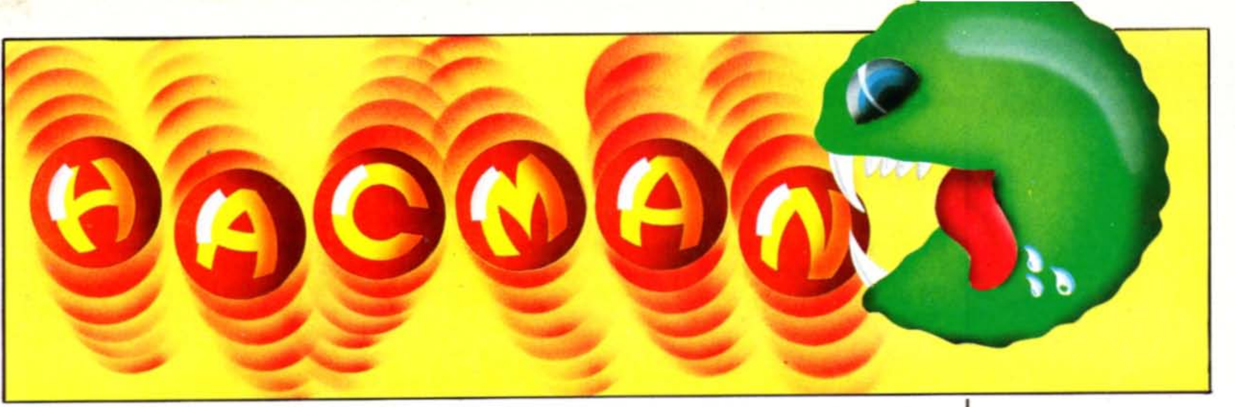

High score update

REGULAR readers may remember the December 1988 column, in which I published a table of high scores by the authors of the featured games. I'm not really keen on them because I know how easy it is to achieve ones artificially by dubious methods such as infinite lives pokes.

Nevertheless, over the last year I have collected quite a few new ones, including Neil Raine's top scores for his three Acornsoft classics and Kevin Edwards' improved Galaforce II high score.

So check out the table for the first update to the definitive Hac-Man high scores table. Although I don't intend to publish updates very often, new entries are always welcome for any BBC Micro game, old or new. It goes without saying that any scores submitted must have been achieved without the use of any poke routines or built-in cheat modes.

Of course there is no way I can tell whether or not a score has been achieved by cheating, but it's only fair on everyone else to play along with this simple rule.

For some time now I've been meaning to raise the point that my Master conversions should also allow the game in question to run on the B+ and B+128. However, the hardware and software architecture of the B+ is considerably closer to the model B than is the architecture of the Master, so illegally written games should need far less converting to run on it.

While on the subject of B+/Master conversions, if anyone has persuaded Android Attack, Bounty Bob Strikes Back, Caveman Capers, Contraption, Jet Set Willy, Jet Set Willy II, Manic Miner, Paranoid Pete or Snakepit to run on the Master (or B+), I would be very interested to hear from them.

Game	Score	Player
Airwolf	75623	Michael Yick
Android Attack	505725	Perdita Patterson
Arkanoid	463020	David Jones
Bruce Lee	123650	David Collins
By Fair Means or Foul	262700	Jonathan Simon
Codename Droid	236000	C. Hyatt
Commando	98600	Matthew Bain
Conqueror	2192100	Dave Smith
Dambusters (Alligata)	18100	David Stott
Danger UXB	101010	Antony Moss
Galaforce II	225750	Kevin Edwards
Hopper	43000	Neil Raine
Labyrinth	163650	Michael Bailey
Meteors	52000	Neil Raine
Mr Ee	855400	Cleone Patterson
Planetoid	541000	Neil Raine
Positron	640580	Chris Beale
Ransack	112650	Charles Ewan
Revs	1.22.9	A. Hooper
Stryker's Run (Master version)	15700	Michael Bailey

Open door for Wulf

As promised in last month's column, here's a routine to convert Ultimate's Sabre Wulf to run on the Master 128. It was the second Ultimate game to be rewritten for the BBC B and instantly became a hit, gaining the reputation of being more than a little bit special – one more than maintained by the other Ultimate games that followed.

However, this degree of excellence was achieved at the expense of legality, for all the company's BBC Micro games are more than liberally sprinkled with routines that prevent them from working with any machine other than a standard BBC B.

Sabre Wulf was also the first well-known game on which the name Kevin Edwards appeared – he devised the cassette protection. Although Sabre Wulf's protection is merely a taste of the thoroughly nasty and later downright evil 6522 timer protection systems with which

Hac Man welcomes you to his last column of the decade

Featuring:

Codename: Droid
Crazee Rider
Sabre Wulf
Holed Out

◀ From Page 99

the name Kevin Edwards came to be associated, it is still an encryption befitting such a game. I found it interesting to return to this aspect of the game, because it uses a particular protection technique that I have not seen used before or since.

The following listing will convert the illegal sections of Sabre Wulf's program code so that the game will run on the Master 128. It certainly should allow the game to be run on the BBC B+ – indeed, I have written it so that it will distinguish between the B+ and the Master and convert accordingly – but I have not been able to test it on the older machine. Nevertheless, I am confident that it will work on the B+. If it doesn't I'm sure you'll let me know.

My apologies for the length of the listing, but there is quite a bit of dodgy code to patch.

When Basic objects

The name Gordon Key will be familiar to many readers for the excellent type-in games listings of his that have appeared in *The Micro User* over the years – Hunkie Egg, Dune Hunter, Prof. McBrolly and Dino to name but a few. More recently, this talented author has turned his hand to writing commercial games and has put his name to Impact Software's Clogger and the excellent golfing game Holed Out from the Fourth Dimension.

I recently received a letter from Tim Wales of Hampton Hill, Middlesex, who says that his copy of Holed Out will not work on his BBC B fitted with Basic I. He loads the game by typing *TAPE followed by CHAIN"" as per the instructions, and the game loads partway, but then crashes with the message *Syntax error at line 30860*.

I spoke to Steve Botterill of Impact Software about this problem, and he confirmed that although Holed Out is now compatible with all BBC Micros, early versions did indeed contain a section of code that would cause the game to fail on a machine fitted with Basic I. The problem occurs in the game's Basic loader and is nothing to do with the main machine code program.

HOLED OUT
PINE ISLES
HOLE 1
PAR 4
LENGTH 481
STEVE 4
WIND
1 WOOD
SELECT CLUB
RANGE 45
ON FAIRWAY
CLUB POWER METER 0%

Holed Out: Now works with Basic I

Before the advent of Basic II the only way to incorporate printable character strings or other non-assembler data bytes into machine code programs was to poke the characters into memory at the current program counter address and then increment the value of the program counter by the length of the string.

Basic II introduced the pseudo-operands EQUB, EQUW, EQUD and EQUS. The first three statements allow programmers to define, respectively, one, two or four data bytes by following the command with either a decimal or a hexadecimal number. Similarly, EQUS allows you to define a string of characters up to 256 characters long.

```
 10 REM Sabre Wulf Master conversion
 20 REM by Hac-Man 1989
 30 REM (C) The Micro User
 40 romsel=&FE30
 50 acccon=&FE34:osbyte=&FFF4
 60 FORI%=0TO2STEP2:P%=&900:[OPTI%
 70 LDA#&81:LDX#0:LDY#&FF:JSR osbyte
 80 CPX#&FE:BCSload
 90 LDA#&14:LDX#0:JSRosbyte
100 LDAromsel:ORA#&80:STAromsel:STA&F4
110 LDA#&18:STAacccon
120 LDA#0:STA&70:STA&72
130 LDA#&89:STA&71:LDA#&C0:STA&73:LDX#3
140 .nextblock LDY#0
150 .loop LDA(&70),Y:STA(&72),Y
160 INY:BNEloop
170 INC&71:INC&73
180 DEX:BNEnextblock
190 .load JMP&2C00
200 ]:NEXT
210 !&2C00=&0CA28CA9:!&2C04=&F42000A0
220 !&2C08=&8D2FA9FF:!&2C0C=&2CA90220
230 !&2C10=&A902218D:!&2C14=&A004A20E
240 !&2C18=&FFF42000:!&2C1C=&2CA044A2
250 !&2C20=&A9FFF720:!&2C24=&A004A20D
260 !&2C28=&FFF42000:!&2C2C=&082C564C
270 !&2C30=&98488A48:!&2C34=&03CAAD48
280 !&2C38=&CA8DFE29:!&2C3C=&68A86803
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300 !&2C48=&2E455242:!&2C4C=&464C5557
310 !&2C50=&30443220:!&2C54=&EEA20D30
320 !&2C58=&A92D0BAC:!&2C5C=&2D00BDED
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370 !&2C80=&ED2D0B6D:!&2C84=&0B2C2D0E
380 !&2C88=&A8FB1002:!&2C8C=&0BCE06D0
390 !&2C90=&2C61CE2D:!&2C94=&D02D01CC
400 !&2C98=&020BADBD:!&2C9C=&B7ADBF10
410 !&2CA0=&AD7085FF:!&2CA4=&7185FFB8
420 !&2CA8=&70B104A0:!&2CAC=&C82DE38D
430 !&2CB0=&E48D70B1:!&2CB4=&BD21A22D
440 !&2CB8=&00952DC3:!&2CBC=&78F810CA
450 !&2CC0=&048D00A9:!&2CC4=&02058D02
460 !&2CC8=&70B110A0:!&2CCC=&C802108D
470 !&2CD0=&118D70B1:!&2CD4=&00A95802
480 !&2CD8=&72857085:!&2CDC=&71852EA9
490 !&2CE0=&73850EA9:!&2CE4=&00A003A2
500 !&2CE8=&729170B1:!&2CEC=&E6F9D0C8
510 !&2CF0=&CA73E671:!&2CF4=&004CF0D0
520 !&2CF8=&52444D0E
530 MODE 7:PRINT"Please insert the Sabre
 Wulf tape, fully rewound, and press any
 key...";:*FX15,0
540 A%=GET:PRINT':CALL &900
```

Once a programmer has become used to the convenience and ease of use offered by the EQU statements, it is easy to forget that Basic I does not support them. Consequently any Basic program that contains 6502 assembly code featuring any of these statements will fail to run on a machine fitted with Basic I.

This problem caught me out in the first few programs I wrote for this column, notably the extra lives poke for Stryker's Run that appeared in the May 1987 column.

The offending section of the early Holed Out program contains both an EQUS and an EQUB, so it's not surprising that poor Basic I cannot cope.

There are two ways of dealing with this situation. One is to modify the loader by hand each time, the other to write a program that will do it for you.

If you choose the first method, insert the Holed Out tape, fully rewound, into your tape recorder and type

```
*TAPE
LOAD""
```

When the HOLEDOUT file has loaded enter:

```
180 END
RUN
PAGE=&1100
LOAD""
```

Wait until the HOLEDOUT2 file has finished loading, then type in the following four lines:

```
30850.dri:]:NEXT
30860$dri="RUN DRIVER2"
30870REM
RUN
```

If you choose the second method type in the following routine below exactly as shown, then save it on a blank tape. Enter:

```
RUN
```

and follow the on-screen instructions.

```
10 REM Holed Out to Basic I conversion
20 REM by Hac-Man 1989
30 REM (C) The Micro User
40 REM
50 MODE 7:PRINT"Please insert the Holed
Out tape, fully rewound, and press any k
ey...";:*FX 15,1
60 A%=GET:*TAPE
70 *KEY 0 LOAD"HOLEDOUT"|M 180END|M RUN|
M PAGE=&1100|M LOAD"HOLEDOUT2"|M 30850.d
ri:]:NEXT|M  30860$dri="RUN  DRIVER2"|M
30870REM|M RUN|M
80 VDU 21:*FX138,0,128
```

SCORE
000000
MPH
000
POS
01

Crazee Rider: Original and compilations version are the same

Back to Opus

A. Shakoor of Ilford, Essex asks if it is possible to make Superior disc games work on the Opus DDOS disc operating system. I don't claim to be an expert on this system, but I know that some games can be tweaked to run on the DDOS system in the same way that I frequently tweak games to run on the Master 128.

Another Opus DDOS owner is Mrs Eileen Powney of Bristol, who wrote the two routines published in this column that persuade Superior's Codename:Droid and Crazee Rider to run under DDOS. For the benefit of anyone who may have missed either showing, the Codename:Droid conversion appeared in the December 1987 issue, while the Crazee Rider conversion was in the August 1988 issue. I suggest that any DDOS owner who is feeling a little left out should have a look at both articles.

Please note that although Mrs Powney wrote her routines for the original, non-compilation, versions of these games, I understand that the disc version of Crazee Rider that appeared on Play It Again Sam II is identical to the stand-alone original. Unfortunately, however, the original and compilation versions of Codename:Droid are not identical, so Mrs Powney's Droid routine will almost certainly not work with the PIAS II version. Perhaps a reader may be able to confirm or deny this, or even provide an alternative routine?

Owners of the not too dissimilar Opus Challenger disc system may also wish to track down the October 1987 issue, which contained a routine to persuade Micro Power's Imogen – arguably the cutest game even seen on the BBC Micro – to run on their particular configuration.

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◀ From Page 82

```
1660 RTS
1670 \
1680 .print2 JSR textY
1690 JSR OSNEWL
1700 JSR inc2:.loop5
1710 LDA (ind_text),Y
1720 CMP #ASC"{":BEQ end
1730 CMP #ASC"}":BEQ end
1740 CMP #255:BEQ end
1750 JSR OSASCI
1760 JSR inc2
1770 JMP loop5
1780 \
1790 .end
1800 JSR OSNEWL
1810 JMP serviced
1820 \
1830 .noluck LDX#0
1840 .loop6 LDA noluck2,X
1850 BMI end:JSR OSASCI:INX
1860 JMP loop6
1870 \
1880 .strip LDA (&F2),Y
1890 CMP #32:BEQ shrink
1900 RTS:.shrink INY
1910 JMP strip
1920 \
1930 .textY STY cY:LDY #0:RTS
1940 .comY LDY cY:RTS
 1950 .noluck2 EQUS"Sorry. No match."+CH
R$13+CHR$255
 1960 \
 1970 .mess EQUS" Use *H <title> for com
plete info."+CHR$13+CHR$255
 1980 \
 1990 .head EQUS"HELPER - Titles present
:"+CHR$13+CHR$13+CHR$255
 2000 \
 2010 .info
 2020 EQUS" *H<return> for index"+CHR$13
 2030 EQUS CHR$255
 2040 .text
 2050 EQUB 0
 2060 ]:NEXT:ENDPROC
 2070 :
 2080 DEFPROCfile
 2090 REPEAT REPEAT
 2100 INPUT"Enter HELP text filename:"f$
 2110 UNTIL LENf$<8 AND f$<>""
 2120 X=OPENUPf$:IF X=0 PRINT'"No such f
ile.":CLOSE#X:I=INKEY(100):CLS
 2130 UNTIL <X>0
 2140 Y%=X:X%=z:A%=2
 2150 A=USR OSARGS:len=!z:CLOSE#X
 2160 IF len>(&BFFF-P%) THEN PRINT'"Text
 is ";len-(&BFFF-P%);" bytes to long."''
TAB(10);"Press a key":G=GET:RUN
 2170 OSCLI"LOAD "+f$+" "+STR$~(O%+1)
 2180 O%=O%+len:?O%=255
 2190 ENDPROC
 2200 :
 2210 DEFPROCsave
 2220 REPEAT
 2230 INPUT'"Enter filename to save by:"
f$
 2240 UNTIL LEN(f$)<8 AND f$<>""
 2250 PRINT''"Saving with:"'" *SAVE ";f$
;" 3000 ";~(O%+1);" 8000 8000"
 2260 PRINT''CHR$130;"OK to save (Y/N) ?
"
 2270 G$=GET$:IF G$<>"Y" GOTO 2220
 2280 OSCLI"SAVE "+f$+" 3000 "+STR$~(O%+
1)+" 8000 8000"
 2290 ENDPROC
 2300 :
 2310 DEFPROCheader
 2320 PRINTTAB(8)CHR$141CHR$129CHR$157CH
R$135" The HELP ROM"SPC3CHR$156TAB(8)CHR
$141CHR$129CHR$157CHR$135" The HELP ROM"
SPC3CHR$156
 2330 PRINT''"This program assembles a s
hort piece of code and then attaches som
e text of yourchoice onto the end."
 2340 VDU28,0,24,39,8:ENDPROC
 2350 :
 2360 REM Error Routine
 2370 CLOSE#0:IF ERR=17 PRINT''"Do you w
ish to quit? Y/N:";:g$=CHR$(GETAND&DF):I
F g$<>"Y" RUN
 2380 REPORT:PRINT" at line ";ERL
 2390 END
```

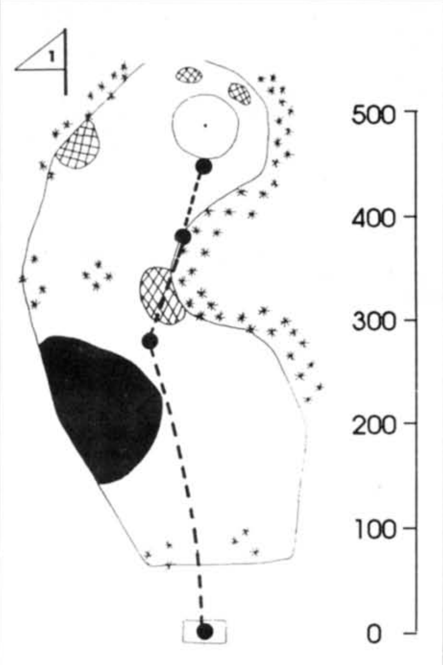
Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 2F88 2
  60 = 36A6 C
  70 = F371 4
  80 = 9719 6
  90 = CA90 A
 100 = AF06 A
 110 = A868 C
 120 = 7267 7
 130 = 7308 3
 140 = ED0F F
 150 = 9719 B
 160 = DF1D 5
 170 = A1D2 7
 180 = A201 6
 190 = 4E48 D
 200 =    0 D
 210 =    0 D
 220 =    0 D
 230 = 1C74 A
 240 = B4E7 F
 250 = D015 9
 260 = 13E3 D
 270 = 6955 1
 280 =  C55 2
 290 = FD02 0
 300 = 7D64 2
 310 = 1C74 0
 320 = ACF8 5
 330 = D973 4
 340 = 310D 7
 350 =    0 7
 360 =    0 7
 370 =    0 7
 380 = FEEA A
 390 = 827C 2
 400 = 2BB2 D
 410 = 6E12 F
 420 = 5171 E
 430 = 3B18 5
 440 = 6020 2
 450 = AF7E 6
 460 =    0 6
 470 =    0 6
 480 =    0 6
 490 = 5B46 6
 500 = 9D84 5
 510 = 51C3 8
 520 = EA45 2
 530 =  C92 8
 540 = 9F71 9
 550 = 4126 E
 560 = 27BB 8
 570 = 7602 0
 580 = 378B A
 590 = B284 B
 600 = 9D84 D
 610 = EA45 8
 620 = 87FF 4
 630 = 194E 0
 640 =  905 4
 650 = 27BB 8
 660 = 7602 1
 670 = BCE6 2
 680 = 16BC D
 690 = AF7E B
 700 =    0 B
 710 =    0 B
 720 =    0 B
 730 = E454 4
 740 = D418 9
 750 = CBF9 E
 760 = 9DC4 8
 770 = D0A2 1
 780 = D187 8
 790 =  9F7 5
 800 =    0 5
 810 =    0 5
 820 =    0 5
 830 = F509 E
 840 =  330 2
 850 = 1311 3
 860 = 5171 8
 870 = 9843 0
 880 = C8F3 5
 890 =  330 E
 900 = 1311 0
 910 =  295 8
 920 = 9843 3
 930 =    0 3
 940 =    0 3
 950 =    0 3
 960 = F4A1 7
 970 = 5107 8
 980 = B350 3
 990 =    0 3
1000 =    0 3
1010 =    0 3
1020 = 8051 0
1030 = C75C F
1040 =  DBF 2
1050 = 3311 9
1060 = 6A0C 4
1070 = 472F 8
1080 = 78A0 C
1090 = F1DF C
1100 = BFBF 7
1110 = 6269 6
1120 = C47E 9
1130 = 49D0 9
1140 =    0 9
1150 = EBF1 C
1160 = 2E18 D
1170 =  372 2
1180 = 3140 D
1190 = 5A2D 6
1200 = 79B3 9
1210 =    0 9
1220 = 8518 0
1230 = C391 D
1240 =    0 D
1250 = AF26 9
1260 = A772 9
1270 = 6437 0
1280 =    0 0
1290 = 14FC E
1300 = E883 D
1310 =    0 D
1320 = 9E03 9
1330 = 5CEC F
1340 = 5A2D D
1350 = 6992 D
1360 = 4DDF E
1370 =    0 E
1380 = 912B 6
1390 = 7333 B
1400 = F616 7
1410 = 9843 7
1420 =    0 7
1430 =    0 7
1440 =    0 7
1450 = F5B6 3
1460 = C0D0 F
1470 = E01C 0
1480 = C824 2
1490 = 7BA1 7
1500 = 17DB B
1510 = A981 2
1520 = 6EC2 7
1530 = C398 4
1540 = A47E 4
1550 = B4E2 E
1560 = 1DAF C
1570 = 26C3 6
1580 = 8CF6 4
1590 = 638D 0
1600 = 19DC 4
1610 = 4B08 A
1620 =    0 A
1630 = A5BB 9
1640 = 4E26 6
1650 = 2C15 9
1660 = 9843 9
1670 =    0 9
1680 = BD9B 0
1690 = 9D84 0
1700 = ABBA C
1710 = 6A0C 9
1720 = 821A A
1730 = F1A5 7
1740 = FBA6 F
1750 = 27BB 4
1760 = C47E C
1770 =  954 8
1780 =    0 8
1790 = E188 2
1800 = 9D84 5
1810 = F25F 3
1820 =    0 3
1830 = 3B9A 6
1840 = FA82 8
1850 = 3B37 5
1860 = 3937 4
1870 =    0 4
1880 = F476 8
1890 = 8A96 7
1900 = 64D9 6
1910 = CDF7 E
1920 =    0 E
1930 =  F03 2
1940 = D0EA 6
1950 = B056 B
1960 =    0 B
1970 = 8E3F 8
1980 =    0 8
1990 = 85E1 3
2000 =    0 3
2010 = D116 E
2020 = DE11 A
2030 = 7E56 C
2040 = 80E0 E
2050 = 1C74 8
2060 = 953B 5
2070 = 9719 D
2080 = 98D7 A
2090 = B1FE 0
2100 = CFC6 2
2110 = D179 7
2120 = BE44 F
2130 = 87BE 9
2140 = EAB0 2
2150 = 6EC5 E
2160 = E689 3
2170 = FA7E 9
2180 = 3275 0
2190 = ED0F D
2200 = 9719 1
2210 = 7A2C 2
2220 = BFBA F
2230 = FFFA 3
2240 = 2D24 A
2250 = A616 C
2260 = 1084 3
2270 = 6219 3
2280 = 4CEC E
2290 = ED0F 1
2300 = 9719 1
2310 = 85EC E
2320 = 218A 8
2330 = 74F3 3
2340 = 69D7 2
2350 = 9719 9
2360 =    0 9
2370 =   69 5
2380 = 6BDF 6
2390 = FD2E 8
```

Around with Botterill

Steve Botterill, co-author of Holed Out!, starts a stroke by stroke account of his tour of Pine Isles

FOLLOWING last month's introduction, I've collected my trolley and have been for a round at Pine Isles, the harder course on the original Holed Out! game. I used the professional level and here's how I managed on the first nine holes. Why not follow me round and see if you can do any better?

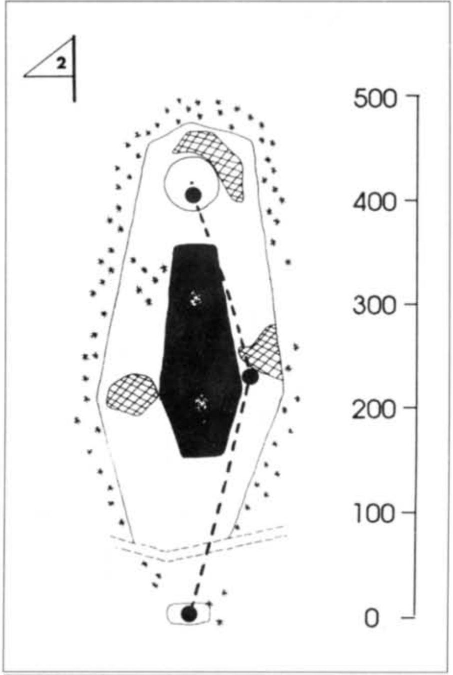


Hole 1 — 481 yards — par 4

There was a fairly strong wind from right to left so I hit the ball at 98 per cent power with a 1 wood, slightly to the left. I was hoping to get between the lake and bunker but it landed with 231 yards to go — not far enough to the left and I couldn't see the green. From there a 3 wood should have landed me on the green, but I hadn't got my swing going and only managed 90 per cent power.

The result was that I hit a tree and the ball fell to a bad lie in the rough with 99 yards still to go. I tried a 9 iron and achieved 98 per cent power — but what bad luck, I landed 25 yards from the hole right on the edge of the green. I played a chip with a wedge at 35 per cent and was left with a 17 foot putt straight uphill to the hole. It didn't go in. With three feet to go I used 12 per cent power and in she went.

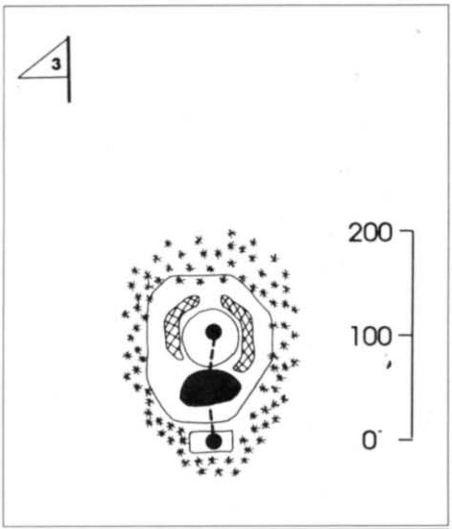
Well, that was a great start — 2 over par.



Hole 2 — 409 yards — par 5

I hit hard over to the right at full power with a 1 wood and hooked it to go up the side of the lake which a gentle left to right wind kept me out of. With 187 yards to the hole I tried a 3 iron at 98 per cent power. That was more like it — 18 feet from the hole after 2. A steep downhill to the left remained, and using 12 per cent power she went down for an eagle 3.

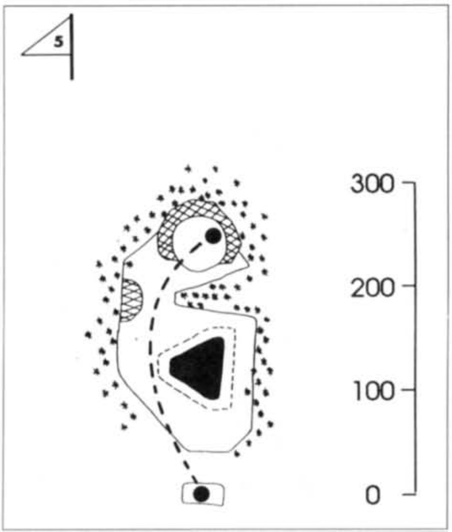
Overall even par.



Hole 3 — 101 yards — par 3

There was a strong headwind so I gave it a good knock with an 8 iron ending 18 feet from the hole. A gentle downhill putt sent it down for a birdie.

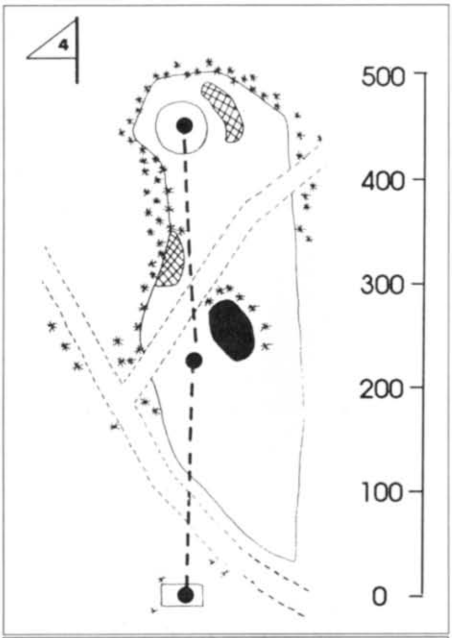
Overall 1 under.



Hole 5 — 239 yards — par 4

I played a 100 per cent 1 wood right over to the left with slice. It curved around the lake and trees beautifully and a strong headwind pulled it up. I ended up on the back of the green 51 feet from the hole. There was a steep left to right slope and as these need a lot of compensation I hit well over to the left at 52 per cent. It ended close but needed tapping in for another birdie 3.

Overall 3 under.



Hole 4 — 456 yards — par 5

I misjudged the drive and got only 82 per cent. The second stroke was no great problem as I was on the fairway and could still easily make the green with only 242 yards to go. A strong right to left wind allowed me to hit to the right of the blocking trees and bunker. I overhit it slightly at 98 per cent.

I was left with a 39 foot putt sloping left to right. My power was OK but I didn't allow enough for the slope.She went down on the fourth stroke for a birdie 4.

Overall 2 under.

Turn to Page 106 ▶

MICRO MEMORY

Another tip you may have forgotten ...or never even known

NOTHING in programming can be more annoying than getting stuck in a program with no means of escape – often because the program contains the statement:

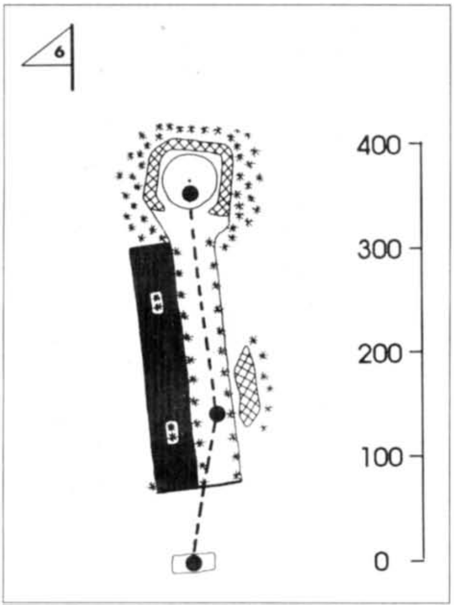
```
ONERROR RUN
```

This should always be avoided – you should always leave yourself an escape route. The following program illustrates an example of the sort of statement you should use:

```
    10ONERROR IF ERR=17 AND t
est=48 STOP ELSE IF ERR=17 R
UN ELSE REPORT:PRINT"at line
 "ERL
    15test=GET
    16GOTO15
```

In the above Escape just causes the program to run again unless 0 was pressed first, in which case it stops. All other errors are reported. In an actual application *test* would be based on a series of events that the user is unlikely to discover accidentally.

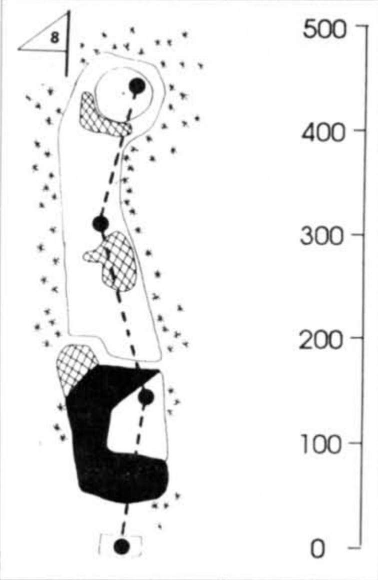
◄ *From Page 105*



Hole 6 — 366 yards — par 4

There was a slight backwind so I tried to drive over to the right and hook it down the fairway between the trees. This usually works well, but not this time — it hit the second row of trees but fortunately dropped on the fairway 204 yards from the hole. A 1 iron at 94 per cent left me 18 feet from the hole and a 24 per cent putt over to the right to allow for the slope gained me another birdie 3.

Overall 4 under.

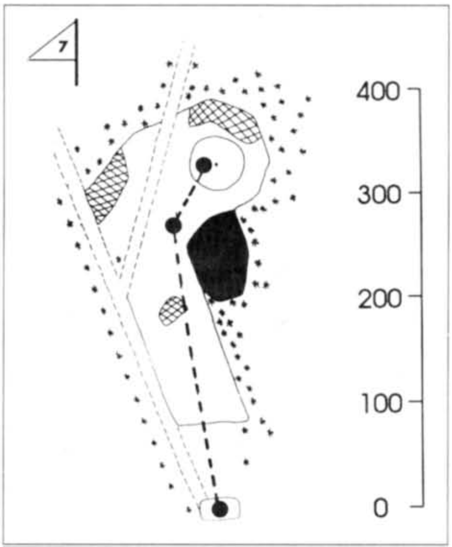


Hole 8 — 430 yards — par 5

Normally I'd use a 7 iron to land on the island, but a strong backwind made me choose an 8. I landed safely with 295 yards to go, so I used my driver but didn't get full power and landed in a bunker. Fortunately it bounced out and I had a 115 yard shot to play.

An 8 iron turned out too be too powerful and I had a 48 foot putt uphill and slightly sloping to the left. I tried to get just over 60 per cent power but only managed 59 per cent. Luckily it just dribbled in for a birdie 4.

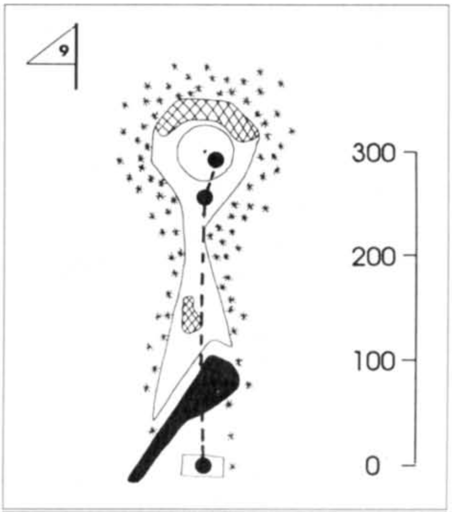
Overall 5 under.



Hole 7 — 330 yards — par 4

This was an uneventful par. I hit my drive left of the water and it bounced over the bunker, coming to rest on the fairway. I played an overhit 9 iron from 94 yards. I then had 2 putts for par 4.

Overall still 4 under.



Hole 9 — 299 yards — par 4

A slight backwind helped my rather bad drive and left me 40 yards from the green. I chipped up with a wedge to leave a 6 foot putt which sank easily for another birdie 3.

Overall 6 under.

● Well, that's all there's time for at the moment. I'm not doing so bad at the moment, but can I keep it up? Join me next month for the last nine holes.

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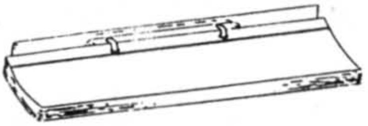

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Bandying words with font regards

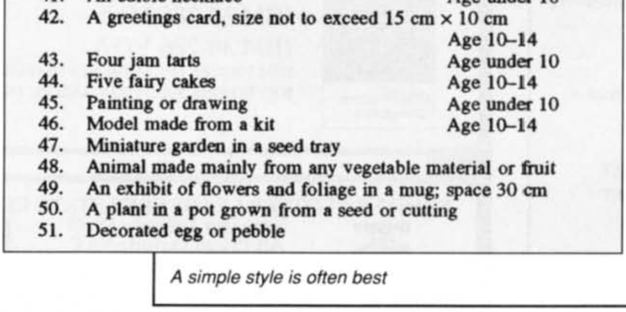
Bruce Goatly continues his series by putting DTP to the acid text

SO far in this series we have looked at the two main components of desktop publishing – words and graphics – but you may have been wondering when we would get down to some proper DTP. The answer is now. Although this month's topic is mainly on text, we'll be wandering into the realms of true DTP. This is because DTP is not solely concerned with mixing text and graphics.

It can be used to improve the presentation of text alone, the frills and fancy bits that make the difference between proper printing and a straight word processed printout. DTP is simply all about giving the best appearance to what you have to say. With that in mind we shall take up the thread from two months ago, when you were left with the task of entering your text using your word processor. Straight away we have to distinguish between body text – the words that make up the stories – and display text – the titling and headlines or cross-headings that announce or break up the body text.

As you will already know if you have been following the series, large amounts of text are what word processors are good at and they should therefore be typed in advance. On the other hand, displayed text is far better applied to the page while you are building it up at the DTP stage. The different software packages available vary considerably in the way they handle words, but let's consider some basic observations on body text.

There are two separate philosophies behind DTP, mainly exemplified by software designed for the 8 bit machines – the BBC B, B+, Master series and Compact – as compared with that for the Archimedes. This results in text being treated in one of two ways, depending on the program. We can refer to the alternatives as graphic and dynamic text handling.



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48.	Animal made mainly from any vegetable material or fruit	
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50.	A plant in a pot grown from a seed or cutting	
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A simple style is often best

In graphic-based programs text is not treated as words but as a graphic image, which makes it very difficult to edit once on the page. In fact if you see anything worse than a simple mistake at this stage it is probably quicker, and certainly tidier, to scrub the text, save the page as it was, return to your word processor to make the changes and then redo the page. This is tedious and underlines the need to get things right first time.

The dynamic principle, used in most of the Archimedes programs, is more in line with the original DTP software from the 16 bit machines, in that every character in a document is treated as a separate entity. This means they can be given different attributes – such as type face and size and whether it is in italic or bold type – as well as being moved or deleted independently of any others. This makes editing on the DTP screen quite practicable and it is awesome to see a change made at one place causing the following text to adjust, rippling all over the page.

Additionally all DTP software falls into two categories, page-based and document-based. For our purposes the distinction is not quite the same as for DTP with 16 bit machines.

In page-based DTP each page is stored as a file on disc, quite separate from any other. So a four page publication consists of four files with separate names and a change to one page may require subsequent pages to be loaded and adjusted individually.

Far more powerful and desirable is the document-based software for the Archimedes, such as Acorn DTP and Impression. As the name implies, a publication is considered as one or more documents, each containing as many pages as you wish, up to limits imposed by memory or disc size. The beauty of this concept is that a change to one page need not be localised to that page – its consequences can flow through the whole document, although unseen until you move to later pages.

To import text into a DTP page or document you must first allocate a space for it to occupy on the page. This is done by creating what different packages describe variously as a window, box or frame into which the text will be read or poured from the disc file.

With most graphic-based software you will need to specify in advance what style the imported text will appear in, because once the process has started it won't stop until either the frame is full or the end of the file has been reached, and once the text is in place it can be a real slog to alter. The Database DTP program, interestingly, provides commands for you to include in the text that allow style changes while the text is being imported.

If you are using software with dynamic text handling you can safely leave the decisions on the text style until after you have finished importing it, because all the characteristics can be changed as often as you wish. However, if you know in advance what you want, both Acorn DTP and Impression let you import style changes with the text.

In graphic programs the frame, once filled, is pretty well unalterable. You can move it about the page and possibly make it larger or smaller overall, but if the shape is wrong it will probably be better to start again. If you try to distort the shape, as you can with Wapping Editor for instance, you will distort the text too, which may not be the effect you wanted.

Dynamic DTP software, however, treats frames as flexible even when they are full, so you can move them around and reshape them to your heart's content. If the frame becomes too small for the encompassed text the contents may overflow into a later frame if one has been specified, or it may be held in memory invisibly, awaiting the opening of another frame.

The text in this area has been set *ragged right*, so all the lines are of unequal lengths and the left margin is straight.

The text in this area has been set *justified*, so all the lines except the last are of equal length. This gives a 'traditional' appearance which is tidy but runs the risk of big gaps between words.

The text in this area has been set *ragged left*, so all the lines are of unequal lengths and the right margin is straight.

Ragged right, justified and ragged left text

DTP programs let you specify a format for your text within the frame. At its most basic that means you can choose between ragged right, where each line ends where it will, or justified, where lines of text are spaced so as to give an even right-hand edge, just like the text in *The Micro User*.

More complicated programs also have options such as ragged left and all lines centred, and sometimes definable indents for first and subsequent lines of a paragraph. Some even allow proportional spacing, where letters have different widths, thus avoiding that typewritten look, and different amounts of leading (pronounced ledding) which is a space, usually small, between each line to give the text a less solid appearance.

So much for body text. Now let's look at display matter, which you will normally wish to type in a different style from the body text, even if only for variety. The size you choose for a heading will depend on its function. A magazine title should be large to be eye-catching, whereas a cross-heading needn't be much larger than the text.

On 8 bit DTP software that uses a 16 by 16 grid for letters, enlarging a font has the side effect of making it rather blocky in appearance as the individual pixels forming each letter are magnified. This can be overcome by smoothing the ragged edges with the pixel editor.

Raggedness is less of a problem in Pixel Perfect, which uses a 48 by 48 grid to make the edges smoother to start with, and it doesn't arise at all with the Archimedes software that uses Acorn's scalable outline fonts, because each letter is drawn with smooth edges regardless of its size.

Typing in your display text may be more or less straightforward. The variety of fonts and sizes available depends on your DTP software, and the text handling may or may not be friendly. For instance, Pixel Perfect won't let you delete a character once it has been typed, whereas Stop Press will let you type and delete letters until you press Return to fix the line.

If your software provides a gridlock function, always use it while typing text because it makes it very much easier to get back to an exact position to make neat corrections.

In the graphic programs you can use the scal-

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Unkerned:

WAY

Kerned:

WAY

Some letters fit together more neatly when kerned

Stretched and squashed

Manipulating text with Impression

◀ *From Page 109*

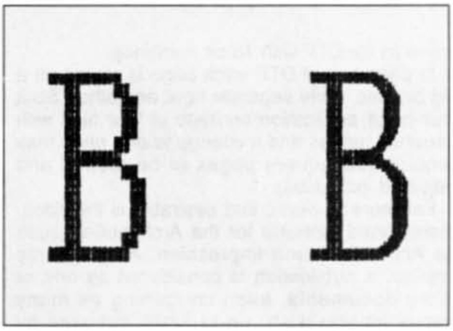
ing options to stretch or squeeze titles once typed in and they have become part of the graphic image on the page. Of the dynamic DTP software only Impression, so far, allows you to alter the width of letters separately from the height, giving text a thin or wide appearance.

Proportional spacing is especially important in titles if you want to avoid gaps either side of narrow letters such as i and l. Most DTP programs include the necessary information in their fonts and although Stop Press fonts themselves don't, they can be loaded into the Wapping Editor font designer and converted to proportional spacing for use with Wapping Editor.

More fonts coming

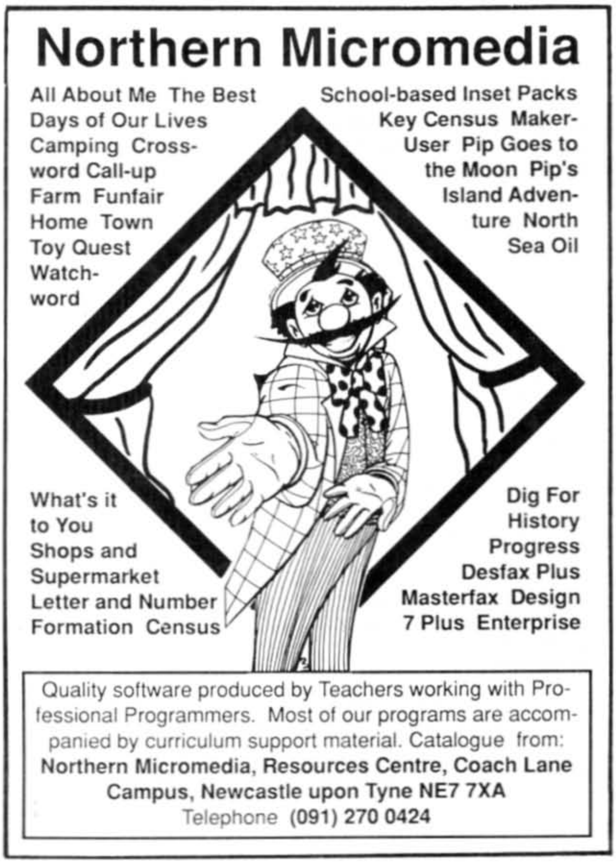
If you are bored with the fonts supplied and feel really creative you can design your own fonts – most 8 bit DTP programs have a designer which can be used to edit existing fonts or create new ones. Sadly, the designer for the latest scalable fonts for the Archimedes is not for sale as yet, so you are restricted to whatever fonts will be released by the software houses. Fortunately there are plans to make more Archimedes fonts available.

One last subtlety: Even with proportional spacing, large type can look unevenly spaced because of the shapes of adjacent letters. For example, consider a capital W next to a capital A. Acorn DTP on the Archimedes allows *kerning* of neighbouring letters, meaning that they can be moved slightly together until they look right to you.



Blobby enlarged 16 x 16 letter and a smoothed version

● *So now you should be able to draw frames – or windows or boxes – then pour text into them and move them about the page, and also type in titles and adjust them. Spend some time practising all these, because next month we bring all the pieces together.*



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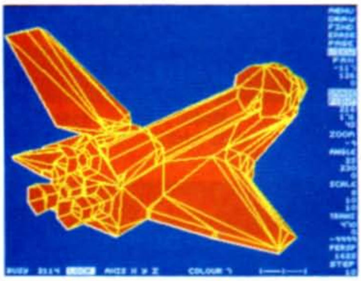

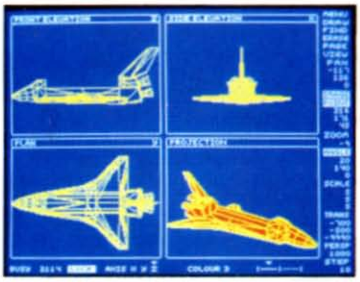

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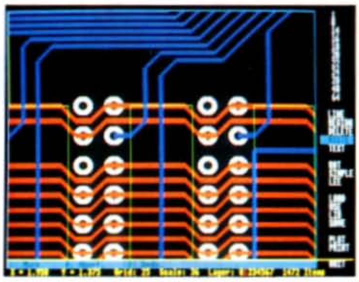

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£10 Prize letter

Going round in Boolean circles

I READ with interest the prize letter from Mr. G. Gromble in the August issue of The Micro User *which had listings that contained the dreaded GOTO.*

In fact they can be completely avoided without really affecting the readability. I have implemented the listings here in a number of programs during the past three years.

Archimedes programmers will recognise that the listings become even more transparent by using the IF... THEN...ENDIF control statement at appropriate lines – although they don't need these constructs anyway.

The WHILE...ENDWHILE construction in Listing I is carried out exactly like a real WHILE...ENDWHILE loop – it is executed when the Boolean execute *is TRUE.*

```
 REM * Listing I
 REM * General idea for WHI
LE...ENDWHILE
 REM * construction from RE
PEAT...UNTIL
 :
 REPEAT
   execute=(.....)
   IF execute THEN code and
/or PROC...
 UNTIL NOT execute
```

In Listings II and III, the words LOOP and EXIT are chosen in accordance with practice in dBASE III. LOOP is executed in listing II when then Boolean condition *is TRUE, since REPEAT is executed when NOT condition is FALSE.*

```
 REM * Listing II
 REM * General idea about L
OOP and
 REM * EXIT within REPEAT..
.UNTIL
 :
 REPEAT
   code and/or PROC...
   REM * LOOP
   condition=(.....)
   IF condition THEN code a
nd/or PROC...
 UNTIL NOT condition
```

In the same way we see that EXIT is executed when the second condition is FALSE, otherwise the code and/or PROC... is executed.

*For the sake of completeness Listing III is given as a normal WHILE...ENDWHILE loop. Here LOOP is executed as long as the condi*tion *is TRUE, and EXIT when the second* condition *is FALSE.*

```
 REM * Listing III
 REM * General idea about L
OOP and
 REM * EXIT within WHILE...
ENDWHILE
 :
 condition=TRUE
 WHILE condition
   code and/or PROC...
   REM * LOOP
   condition=(.....)
   IF condition ENDWHILE
   REM * EXIT
   condition=(.....)
   IF condition THEN code a
nd/or PROC...
 ENDWHILE
```

Undoubtedly the FOR... TO...NEXT...STEP loop can be converted in a similar way as that practised above. However, the construction as such is of little use, because I did not see it mentioned anywhere.

Listings II and III completely satisfy the need for LOOP followed by EXIT within WHILE...ENDWHILE loops. – **E. D. Engelhardt, Rijswijk, Netherlands.**

Win a tenner

● Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

Writers of the most interesting letters receive a £10 prize.

VDU 19 parameters

CAN you tell me when Acorn will allocate the superfluous digits on the VDU 19 command and what they will be used for? Also, how can I find more information about the Master plot codes reserved for Acornsoft sprites? – **Drew Knight, Walker, Newcastle-upon-Tyne.**

● The extra VDU 19 parameters are used on the Archimedes to select the levels of red, green and blue in the new colour.

Each parameter has 16 possible values, therefore 4,096 _16 x 16 x 16_ colours are available.

We do not know of any full documentation on the Master plot codes reserved for Acornsoft sprites. If any reader can help please let us know.

3D Asteroids on Archimedes

I HAVE been having problems running the game 3D Asteroids – which has an Archimedes-compatible symbol shown – from the March 1989 issue of The Micro User *on my A310.*

Whenever there is an occurence of a £ in the data statements my micro turns it into a FALSE. Please can you tell me what is going on? – *G. Drywood, Northfield, Birmingham.*

● Sorry, this listing does not work on the Archimedes – the symbol was left in by mistake – and it won't work on either of the BBC Micro emulators.

The £ is turned to FALSE because on the Archimedes it has an Ascii value of 164, and in Basic programs this is interpreted as a token unless it is part of a string. Character 96 on the Archimedes is the back apostrophe at the top left of the keyboard and this can be used to replace £ in the data statements of some programs that were originally written for the 8 bit BBC Micro.

Unfortunately there are several other incompatibilities in Asteroids that would prevent it running even if you do this.

Turning roms back on

IN your August issue I saw the letter by Alec Hanson asking how to turn off roms. You said you can do this by typing ?(&2A1+X)=0 where X *is the rom number, but you did not say how to turn them back on again.*

The way to do this is to enter ?(&2A1+X)=Y where X *is the rom number and* Y *is the rom type byte which is usually one of three values:*

Service rom (S)	82
Language rom (L)	60
Service/Language rom (SL)	194

Utility roms are usually type S, Basic is type L and other languages – such as View – are type SL. – **Jason Kane, Dereham, Norfolk.**

Protected listings

I HAVE recently discovered an easy way to insert control codes into my programs using the Master 128's Edit program to prevent other people listing them.

While in Basic, type EDIT and then move the cursor to the position that you wish to insert a code. Then, using the control key, enter it. For

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◀ From Page 113

example, the code to switch off screen output is 21 and is produced by Control+U.

In the editor the control codes will appear as characters printed in inverse colours, but on return to Basic will regain their normal effect.

Other control codes are:

Control+G: *Produce a beep.*
Control+U: *Switch off output to the screen.*
Control+F: *Switch on output to the screen.*
Control+L: *Clear the screen.*

The method is not failsafe, but it will stop an amateur hacker from listing your programs. – **T. Boon, St. Albans, Herts.**

Dumper utility spin-offs

I TYPED in your memory dumper program for the September issue of The Micro User. *It worked perfectly on my B+128 and I discovered some interesting things about my micro's memory.*

After using the program for a few days I realised that it had great potential for producing other disc-based utilities, as it has all the code for collecting the parameters from the command.

With minimum modifications to the program I produced two useful routines, the first of which wipes out an area of memory by filling it with zeros.

It can be used to clear a Basic or machine code program, quickly destroy all the function key definitions and various other things. It is created as follows:

Load the source code for the memory dumper into memory.

Delete lines 470 and 480, 510 to 630 and 780 to 1010.

Add these lines:

```
510 LDA end_ad
530 LDA #0
540 LDX #0:STA (addr,X)
640 LDA addr:CLC:ADC #1:STA
addr
```

In lines 270 and 1620 MDump should be change to MWipe or something similar. Also, if you wish the address of each memory location to be printed as it is wiped out, you should add a line:

```
520 JSR pr_addr:JSR OSNEWL
```

The second utility is a memory encoder which works by Exclusive-ORing the contents of the memory location with its address, which means that the same programm can be used for encoding and decoding.

Line 505 has been put in to make it easier to change the encoding/decoding process, and the program can be used for software protection. For instance, to encode a Basic program type P.~PAGE,~TOP and you will get the numbers xxxx *and* yyyy. *Type *MCode xxxx yyyy, and then *SAVE progname xxxx yyyy.*

*The program can then be loaded with *LOAD progname, and decoded with *MCode xxxx yyyy where, on a disc system,* xxxx *and* yyyy *can be found with *INFO – xxxx being the first number displayed and yyyy the second. Don't forget that all numbers are in hexadecimal. The alterations to the MDump source are:*

Load the source code for the memory dumper into memory.

Delete lines 470 and 510 to 630 and add these lines:

```
505 LDA addr:STA &F8
510 LDA buff
520 EOR &F8
530 LDX #0:STA (addr,X)
640 LDA addr:CLC:ADC #1:STA
addr
```

Again, change the MDump in lines 270 and 1620 to MCode or another suitable name.

Can anyone else come up with any more useful disc-based utilities from MDump? – **R. J. Houston, Harrogate, North Yorkshire.**

● It just proves what you can do with a piece of code and a little imagination. We would like to hear of any other alterations that readers have made to programs published in *The Micro User.*

Missing background

IN the May 1989 issue of The Micro User *you featured a program called Caption. The monitor screen on the front cover of the magazine shows the text on a blue background, yet in the program itself I cannot find a routine which allows the background colour to be changed.*

Can you please help me by rectifing the problem? – **D. N. Edwards, Heswall, Wirral.**

● You can easily change the background colour by modifying line 2140 to read:

```
2140DEFPROCact:VDU19,1,AW
;0;19,0,col;0;:ENDPROC
```

In the above, *col* is the number of the colour for the required colour. You should either replace it with the actual value or put:

```
INPUT"Background colour"col
```

on an earlier line.

Receiving viewdata on the Archimedes

I AM very interested in upgrading my Master to an Archimedes, probably an A3000, but wish to retain the ability to receive teletext transmissions. All the dealers I have contacted have told me that there is no possibility of this on an Archimedes as it doesn't contain a teletext chip.

However in the January 1988 issue of The Micro User *I found the following question and answer:*

Q: *Can the Archimedes connect to online information services such as Microlink?*

A: *With a modem and appropriate software the Archimedes is capable of communicating with all information providers. Also, having Mode 7 teletext, it can easily communicate with viewdata systems.*

Can you please tell me who is right, as I am completely confused. Can I use a teletext adaptor or not? – **H. McDonald, Bexhill-on-Sea, East Sussex.**

● At present teletext cannot be received on an Archimedes because no hardware for receiving services such as Ceefax and Oracle is available.

However this does not mean that the Archimedes cannot receive viewdata, as this is accessed using a modem and a telephone line, so an Archimedes with a modem and suitable software can be used to access online viewdata.

The two systems of viewdata and teletext are completely different to each other and it is this that confuses a large number of people. Teletext is a one-way system broadcast over the television airwaves whereas viewdata is an interactive system conected via the telephone network.

Teletext cannot be accessed with a modem, and Viewdata cannot be accessed with a teletext adaptor.

If you want telesoftware you can get it using an Archimedes and modem linked to MicroLink.

Bumper Pack 2 revisited

I WOULD like to thank you for devoting a page of your May 1989 issue to reviewing our Archimedes compilation – Bumper Pack 2.

I accept many of the comments made by David Marshall but I felt that I had to reply regarding some fundamental points that he raised:

We have produced a num-

ber of content-free *packages which have been reviewed favourably in* The Micro User *and other magazines, but six years of sales figures show that our* content-free *packages are consistently outsold by our* old-fashioned drill and practice programs *– this is the type of program many parents and teachers (and children) prefer to buy.*

As mentioned in my press release, Bumper Pack 2 is available at nominal handling charge to anyone who has bought the BBC/Master version – our customers have paid good money for their 8 bit software and to be able to use the games on their new Archimedes is rather an advantage I would have thought, particularly if they have traded in their old machine.

Customers have frequently expressed their appreciation of this upgrade service – a service we also offered at the launch of the BBC B+, Master 128 and the Master Compact. They have also complained about other publishers of educational compilations not offering the same service.

We are currently working on new products that will take advantage of the enormous potential of the Archimedes, but we will also continue to make low-priced – less than £4 per game – compilations of our drill and practice programs available for the many children, teachers and parents who enjoy them and who also helped to make our Archimedes compilation – Bumper Pack 1 – one of our best sellers. – **Stuart Forbes, H.S. Software, Swansea, West Glamorgan.**

● *David Marshall replies:* Many thanks for your comments – most of which I agree with. I am sure that your "old-fashioned", drill type programs outsell your excellent content-free packages – many of which I have favourably reviewed.

It is the same for all software manufacturers but this does not make drill and practice the best software. It is certainly the easiest to use and least demanding on the user, but this is not necessarily the best criteria for selection. We in education have to concern ourselves with why it still outsells "better" software that has the potential to extend and enhance current classroom practice rather than merely replicate it.

Have reviews, INSET, books, TV programs, MEP, MAPE, MESU and so on achieved so little? Although you say the majority of teachers and parents prefer drill software that too doesn't make it right – remember Ibsen: "The majority has the might – more's the pity – but it hasn't right .... The minority is always right ...." – An Enemy of the People, Act 4.

One thing is certain though, "drill" type programs do not exploit the potential of any micro – least of all the Archimedes, and this is the main point I was making. I am excited to hear that HS is working on new products that will explore the Archimedes' capability.

I, too, would like to applaud your upgrade service – I also wish other manufacturers offered the same. I do hope, however, that not too many schools have traded in their BBC/Masters for their Archimedes. There really isn't too much software for it yet and we all await other packages from HS with eager anticipation.

Booting Risc OS

I USE an Archimedes 310 and cannot boot my 3.5in monthly subscription disc. All I get is:

```
RISC OS 1024k
Acorn ADFS
*CHAIN"Header"
 Bad  file  name  'Chain
"Header"'(Error number &CC)
```

Can you help? – **Kenneth F. Middleton, Belfast.**

● The disc does work on an Archimedes with Risc OS, but it cannot be booted with Shift+Break. As the Desktop is a superb menu system in itself, the 8 bit menu has not been converted to work as a native Archimedes program. If you really want to use it, load the !65Host emulator and then *exec !boot.

The better way is to enter the Risc OS desktop and select the drive icon. This will provide you with a catalogue of the root directory and any files displayed as Basic should be compatible with the Archimedes and can be run by double-clicking on them.

Count down with VDU 19

RECENTLY I needed to do a visual countdown on my micro from five to zero and after much consideration decided to use a large graphic display and the VDU 19 method.

The listing below will draw a calculator style figure 8 in different physical colours, and then turn on and off sections of the number – in order to make the numbers – using VDU 19.

Because there are seven colours plus a background Mode 2 is used. – **Jason Kane, Dereham, Norfolk.**

```
   10 REM Countdown
   20 REM by Jason Kane
   30 MODE 2
   40 PROCcursoroff
   50 PROCscreenoff
   60 PROCdrawscreen
   70 REPEAT
   80 PROCcountdown
   90 PROCpause(3000)
  100 UNTIL FALSE
  110 DEFPROCcursoroff
  120 VDU 23;8202;0;0;0;
  130 ENDPROC
  140 DEFPROCpause(T)
  150 FOR R=1 TO T
  160 NEXT R
  170 ENDPROC
  180 DEFPROCscreenoff
  190 FOR W=1 TO 7
  200 PROCoff(W)
  210 NEXT W
  220 ENDPROC
  230 DEFPROCcountdown
  240 PROCscreenoff
  250 FOR Z=5 TO 1 STEP -1
  260 VDU 7
  270 PROClon(Z)
  280 PROCpause(600)
  290 NEXT Z
  300 PROCscreenoff
  310 ENDPROC
  320 DEFPROCscreenon
  330 FOR S=1 TO 7
  340 PROCon(S)
  350 NEXT S
  360 ENDPROC
  370 DEFPROCon(D)
  380 VDU 19,D,7;0;
  390 ENDPROC
  400 DEFPROCoff(M)
  410 VDU 19,M,0;0;
  420 ENDPROC
  430 DEFPROClon(N)
  440 PROCscreenoff
  450 IF N=1 THEN PROCon(3
):PROCon(6)
  460 IF N=2 THEN PROCon(1
):PROCon(3):PROCon(4):PROCo
n(5):PROCon(7)
  470 IF N=3 THEN PROCon(1
):PROCon(3):PROCon(4):PROCo
n(6):PROCon(7)
  480 IF N=4 THEN PROCon(2
):PROCon(3):PROCon(4):PROCo
n(6)
  490 IF N=5 THEN PROCon(1
):PROCon(2):PROCon(4):PROCo
n(6):PROCon(7)
  500 DEFPROCdrawscreen
  510 GCOL 0,1
  520 MOVE 100,900:MOVE 10
00,900:PLOT 85,950,850:PLOT
 85,150,850:PLOT 85,100,900
  530 GCOL 0,2
  540 MOVE 100,900:MOVE 15
0,850:PLOT 85,150,600:MOVE
125,575:MOVE 100,600:PLOT 8
5,150,600:PLOT 85,100,900
  550 GCOL 0,3
  560 MOVE 1000,900:MOVE 9
50,850:PLOT 85,950,600:MOVE
 975,575:MOVE 1000,600:PLOT
 85,950,600:PLOT 85,1000,90
0
  570 GCOL 0,4
  580 MOVE 150,550:MOVE 12
5,575:PLOT 85,150,600:MOVE
150,550:MOVE 150,600:PLOT 8
5,950,600:MOVE 975,575:PLOT
 85,950,550:MOVE 950,600:PL
ot 85,150,550
  590 GCOL 0,5
  600 MOVE 100,250:MOVE 15
0,300:PLOT 85,100,550:MOVE
150,550:PLOT 85,150,300:MOV
e 100,550:MOVE 150,550:PLOT
 85,125,575
  610 GCOL 0,6
  620 MOVE 1000,250:MOVE 9
50,300:PLOT 85,1000,550:MOV
E 950,550:PLOT 85,950,300:M
OVE 1000,550:MOVE 950,550:P
LOT 85,975,575
  630 GCOL 0,7
  640 MOVE 100,250:MOVE 15
0,300:PLOT 85,950,300:MOVE
1000,250:PLOT 85,100,250
  650 ENDPROC
```

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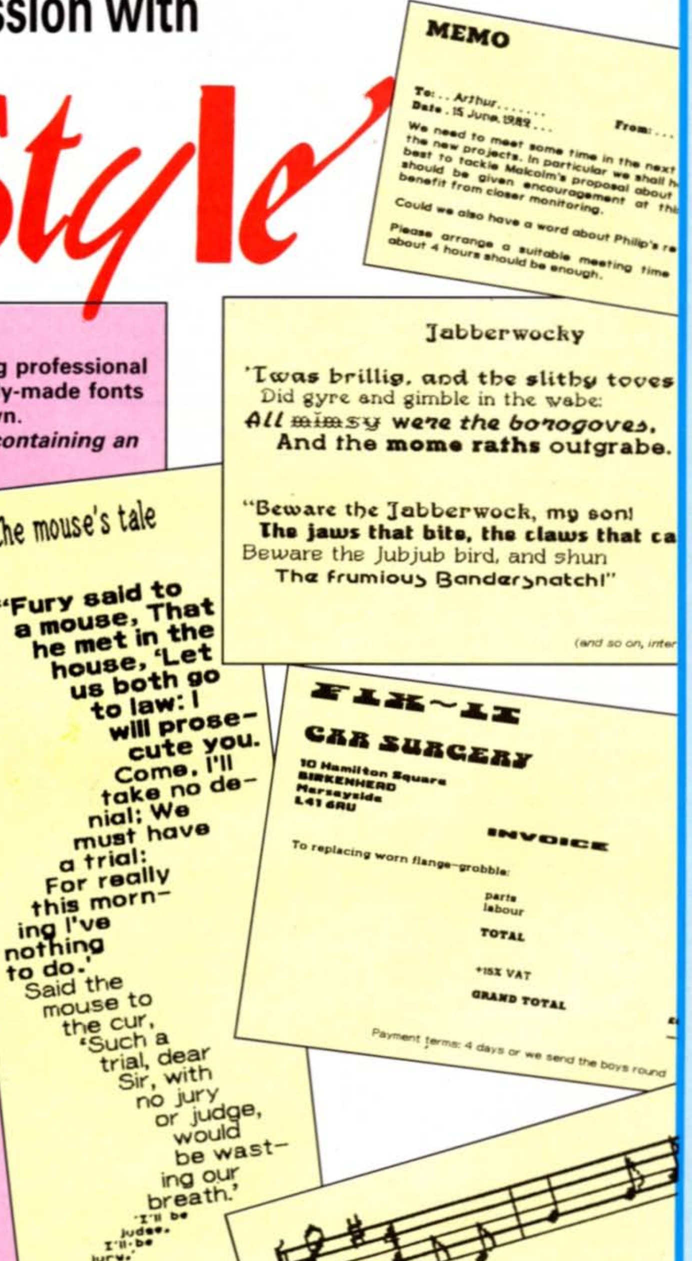

MEMO

To: .. Arthur........
Date . 15 June, 1989 ... From: ...

We need to meet some time in the next
the new projects. In particular we shall h
best to tackle Malcolm's proposal about
should be given encouragement at thi
benefit from closer monitoring.

Could we also have a word about Philip's re

Please arrange a suitable meeting time
about 4 hours should be enough.

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

(and so on, inter

The mouse's tale

"Fury said to
a mouse, That
he met in the
house, 'Let
us both go
to law: I
will prose-
cute you.
Come, I'll
take no de-
nial; We
must have
a trial:
For really
this morn-
ing I've
nothing
to do.'
Said the
mouse to
the cur,
'Such a
trial, dear
Sir, with
no jury
or judge,
would
be wast-
ing our
breath.'
'I'll be
judge,
I'll be
jury,'
Said
cun-
ning
old
Fury:
'I'll
try
the
whole
cause,
and
con-
demn
[illegible]
[illegible]

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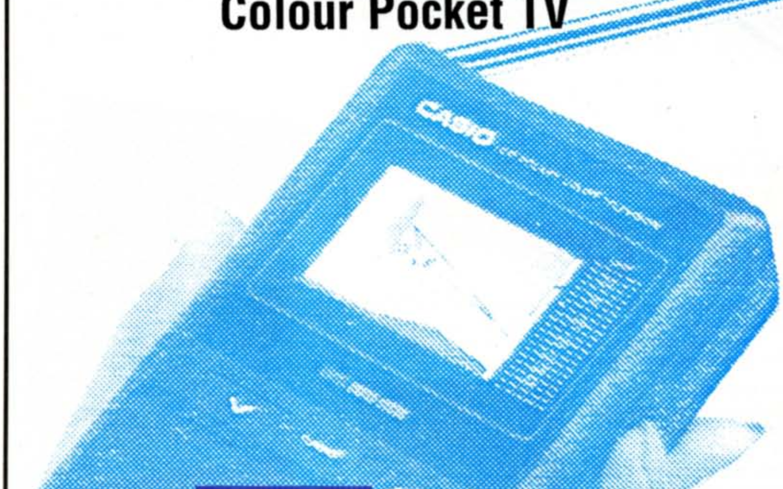

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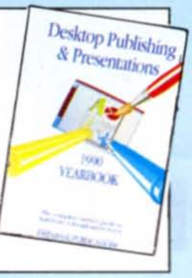

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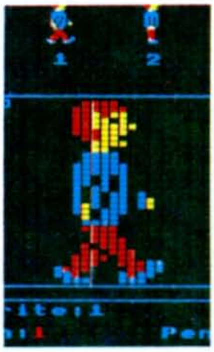

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(see page 116)

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(see page 127)

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MU12

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```
 880 PRINTSPC(12)"Are you sure?"
 890 PROCw(40):*FX21,0
 900 REPEAT UNTIL GET:G$=GET$
 910 IFG$="Y"ORG$="y"THEN920ELSE940
 920 new%=0:q%=0
 930 SOUND&0010,-15,1,5
 940 VDU26:PROCmark(8,0):*FX12,0
 950 PROCmode("Compose")
 960 PROCw(40):ENDPROC
 970 DEFPROCplay(pitch%)
 980 IFnew%=0THEN TIME=0
 990 P%=pitch%+TR%
1000 IFf1%=0ANDnew%=1PROCstore
1010 SOUND&0011,1,P%,1:SOUND&0012,1,P%+
1,1
1020 f1%=1:new%=1:ENDPROC
1030 DEFPROCsound
1040 IFnew%=0THEN TIME=0
1050 IFf1%=0ANDnew%=1PROCtime
1060 SOUND&0011,A%(q%),P%(q%),1:SOUND&0
012,A%(q%),P%(q%)+1,1
1070 f1%=1:new%=1:ENDPROC
1080 DEFPROCreplay:PROCmark(2,1)
1090 IFO%=1PROCmode("Playback")
1100 FORL%=0TOq%:TIME=0
1110 IFA%(L%)>0REPEAT:SOUND&0011,A%(L%)
,P%(L%),1:SOUND&0012,A%(L%),P%(L%)+1,1:U
NTILTIME>=D%(L%)ELSEREPEATUNTILTIME>=D%(
L%)
1120 NEXT:ENDPROC
1130 DEFPROCstore
1140 IFq%=KA%O%=6:f1%=0:ENDPROC
1150 D%(q%)=TIME
1160 IFf1%=0A%(q%)=0:P%(q%)=0ELSEA%(q%)
=1:P%(q%)=P%
1170 f1%=0:q%=q%+1:TIME=0:ENDPROC
1180 DEFPROCtime:D%(q%)=TIME
1190 f1%=0:q%=q%+1:TIME=0:ENDPROC
1200 DEFPROCtranup
1210 IFTR%+48>116ENDPROC
1220 TR%=TR%+48:PROCoct:ENDPROC
1230 DEFPROCtrandown
1240 IFTR%-48<-48ENDPROC
1250 TR%=TR%-48:PROCoct:ENDPROC
1260 DEFPROCkeyup
1270 IFTR%+4>116ENDPROC
1280 TR%=TR%+4:K%=K%+1:IFK%>11K%=0
1290 PROCoct:ENDPROC
1300 DEFPROCkeydown
1310 IFTR%-4<-48ENDPROC
1320 TR%=TR%-4:K%=K%-1:IFK%<0K%=11
1330 PROCoct:ENDPROC
1340 DEFPROCtoggle:PROCmark(14,1)
1350 XI%=XI%+1:IFXI%>2XI%=1
1360 IFXI%=2PRINTTAB(32,3)"Octave"
1370 IFXI%=1PRINTTAB(32,3)" Key  "
1380 PROCw(40):PROCmark(14,0)
1390 ENDPROC
1400 DEFPROCoct
1410 PRINTTAB(34,YO%)"  "
1420 IFTR%>=-4ANDTR%<48YO%=7
1430 IFTR%<=-4YO%=8
1440 IFTR%>=48YO%=6
1450 IFTR%>=96YO%=5
1460 IFYO%<8PRINTTAB(34,YO%)STRING$(2,"
_")
1470 PRINTTAB(34,YO%)K$(K%)
1480 IFYO%>5PRINTTAB(34,YO%-1)STRING$(2
,"_")
1490 IFYO%<7PRINTTAB(34,YO%+1)STRING$(2
,"_")
1500 IFO%<>7PROCw(40)
1510 ENDPROC
1520 DEFPROCstep:PROCmark(4,1)
1530 PROCw(50):PROCmark(4,0)
1540 PROCmark(6,1)
1550 PROCmode("Step through")
1560 f1%=0:new%=0:q1%=q%:q%=0:REPEAT
1570 IFINKEY-55PROCsound:GOTO1570
1580 IFf1%=1:PROCtime
1590 UNTILq%>=q1%:q%=q1%
1600 ENDPROC
1610 DEFPROCselectup
1620 ON XI% GOSUB 110,120
1630 ENDPROC
1640 DEFPROCselectdown
1650 ON XI% GOSUB 130,140
1660 ENDPROC
1670 DEFPROCmark(MY%,M%):my%=MY%
1680 IFO%>0PROCins2(M%)
1690 COLOURM%:PRINTTAB(0,MY%)H$
1700 COLOUR1:ENDPROC
1710 DEFPROCdelete:PROCmark(12,1)
1720 IFq%<2:SOUND1,1,P%(q%-1),3:SOUND2,
1,P%(q%-1)+1,3:PROCmark(12,0):q%=q%-1:ne
w%=0:ENDPROC
1730 q%=q%-2:SOUND1,1,P%(q%+1),3:SOUND2
,1,P%(q%+1)+1,3
1740 PROCw(50):PROCmark(12,0):ENDPROC
1750 DEFPROCfull:VDU28,0,25,39,22
1760 CLS:PRINT" The memory is now full!
 Press any key"
1770 PROCkey:ENDPROC
1780 DEFPROCcat:*FX200,1
1790 PRINTTAB(13,25)"Press Any Key"
1800 VDU28,0,24,39,2:CLS:*CAT
1810 PROCkey:VDU28,0,25,39,2:CLS
1820 PROCmode("Compose")
1830 PROCinst:*FX200,0
1840 ENDPROC
1850 DEFPROCname
1860 VDU28,0,24,39,22:VDU15
1870 *FX21,0
1880 *FX202,48
1890 CLS:INPUTSPC(3)"Enter name of tune
 ... "T$:CLS:IFLENT$<1ORLENT$>7GOTO1890
1900 ENDPROC
1910 DEFPROCspool:PROCmark(20,1)
1920 PROCname
1930 CLS:INPUTSPC(3)"Enter first line n
umber "N%:IFN%<0ORN%>2000GOTO1930
1940 CLS:INPUTSPC(3)"Enter Envelope num
ber "EN%:IFEN%<1OREN%>4GOTO1940
1950 PROCenvsetup(EN%)
1960 *FX200,1
1970 VDU28,0,25,39,22:CLS
1980 DIM C 20:$C="SPOOL "+T$
1990 X%=C MOD256:Y%=C DIV256:CALL&FFF7
2000 PRINTN%"PROC"T$
2010 PRINTN%+10"END"
2020 PRINTN%+20":"
2030 PRINTN%+30"DEFPROC"T$
2040 PRINTN%+40"ENV."EN%",3,0,0,0,0,0,0
,121,-10,-1,-2,120,120"
2050 PRINTN%+50"RES."N%+90":F.B%=0TO"q%
":READA%,P%,D%:TI.=0"
2060 PRINTN%+60"IFA%>0REP.:SO.&0011,A%,
P%,1:SO.&0012,A%,P%+1,1:U.TI.>=D%EL.REP.
U.TI.>=D%"
2070 PRINTN%+70"N.:E."
2080 PRINTN%+80":":FORA=0TOq%STEP4
2090 PRINTA*(10/4)+N%+90"D."A%(A)","P%(
A)","D%(A)","A%(A+1)","P%(A+1)","D%(A+1)
","A%(A+2)","P%(A+2)","D%(A+2)","A%(A+3)
","P%(A+3)","D%(A+3)
2100 NEXT:*SPOOL
2110 CLS:SP%=8-(LENT$)/2
2120 PROCenvsetup(1):CLS
2130 PRINTSPC(SP%)T$" now saved. Press
any key"
2140 PROCkey:ENDPROC
2150 :
2160 DEFPROCenvsetup(en%)
2170 FORL%=0TOq%STEP2
2180 A%(L%)=en%:NEXT:ENDPROC
2190 DEFPROCinit:DIMs%(2):DIMo%(2)
2200 DIMt%(2):DIMy%(2):DIMK$(11)
2210 DIMA%(KA%):DIMP%(KA%):DIMD%(KA%)
2220 RESTORE2870:FORL%=0TO11:READK$(L%)
2230 NEXT
2240 RESTORE2880:FORL%=0TO2:READs%(L%),
o%(L%),t%(L%),y%(L%):NEXT
2250 ENVELOPE1,3,0,0,0,0,0,0,121,-10,-1
,-2,120,120
2260 VDU23,224,0,0,0,0,0,0,0,255
2270 VDU23,225,16,56,84,146,16,16,16,16
2280 VDU23,226,16,16,16,16,146,84,56,16
2290 VDU23,228,255,0,0,0,0,0,0,0
2300 VDU23,229,0,0,0,255,0,0,0,0
2310 H$=CHR$(123)+CHR$(9)+CHR$(125)
2320 KEY$=CHR$32+CHR$32+CHR$8+CHR$8+CHR
$10+CHR$32+CHR$32+CHR$8+CHR$8+CHR$10+CHR
$32+CHR$32
2330 PROCscale:@%=0:f1%=0:K%=0
2340 my%=0:N%=10:new%=0:O%=0:q%=0
2350 q1%=0:TR%=0:XI%=2:YO%=0:ENDPROC
2360 DEFPROCscale:C%=53:D%=61
2370 E%=69:F%=73:G%=81:A%=89:B%=97
2380 c%=57:d%=65:f%=77:g%=85:a%=93
2390 ENDPROC
2400 DEFPROCinst:VDU26
2410 PRINTTAB(8,0)"J i n g l e   B e l
l s"
2420 PRINTTAB(8,1)STRING$(23,CHR$(228))
2430 PRINTTAB(1,2)"P  = Play back tune"
2440 PRINTTAB(1,4)"1  = Enter step mode
"
2450 PRINTTAB(1,6)"0  = Step through tu
ne"
2460 PRINTTAB(1,8)"W  = Wipe complete t
une"
2470 PRINTTAB(1,10)"4  = Catalogue tape
 or disc"
2480 PRINTTAB(1,12)"Q  = Delete last no
te played"
2490 PRINTTAB(1,14)"T  = Toggle key & o
ctave shift"
2500 PRINTTAB(1,16)"8  = Output file to
 tape or disc"
2510 PRINTTAB(1,18)"9  = Input file fro
m tape or disc"
2520 PRINTTAB(1,20)"6  = Spool procedur
e to tape or disc"
2530 PRINTTAB(0,21)STRING$(40,CHR$(229)
)
2540 PROCledger:ENDPROC
2550 DEFPROCins2(c1%)
2560 COLOURc1%:COLOUR128
2570 PRINTTAB(1,25)"Press Escape to ret
urn to compose mode":ENDPROC
```

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contex

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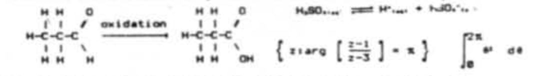

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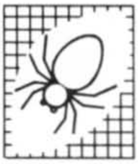

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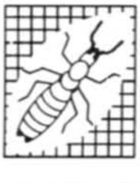

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◀ *From Page 120*

```
 2580 DEFPROCmode(M$)
 2590 VDU28,0,24,39,22:CLS:VDU26
 2600 COLOUR129:COLOUR0
 2610 SP%=18-(LENM$)/2
 2620 PRINTTAB(SP%,23)M$" mode"
 2630 COLOUR128:COLOUR1:ENDPROC
 2640 DEFPROCkeyboard:VDU4:RESTORE2910
 2650 MOVE0,0:MOVE1279,0:PLOT85,0,188
 2660 PLOT85,1279,188:GCOL0,0
 2670 FORL%=100TO1178STEP98:MOVEL%,188
 2680 DRAWL%,0:NEXT:COLOUR0:FORL%=1TO9
 2690 READZ%:PRINTTAB(Z%,26)KEY$:NEXT
 2700 VDU5:GCOL3,1:FORL%=0TO2
 2710 FORLL%=s%(L%)TOo%(L%)STEPt%(L%)
 2720 READCH$:MOVELL%,y%(L%):PRINTCH$
 2730 NEXT:NEXT:VDU4:COLOUR1:GCOL0,1
 2740 MOVE0,188:DRAW1279,188:ENDPROC
 2750 DEFPROCledger:VDU26:FORL%=5TO7
 2760 PRINTTAB(32,L%)STRING$(6,"_")
 2770 NEXT:MOVE1016,656:DRAW1016,944
 2780 DRAW1220,944:DRAW1220,656
 2790 DRAW1016,656
 2800 PRINTTAB(32,3)"Octave"
 2810 PRINTTAB(32,10)"Shift"
 2820 PRINTTAB(32,4)CHR$(225)
 2830 PRINTTAB(37,9)CHR$(226)
 2840 PROCoct:ENDPROC
 2850 DEFPROCw(p%):TIME=0
 2860 REPEATUNTILTIME>=p%:ENDPROC
 2870 DATAC,C#,D,D#,E,F,F#,G,G#,A,A#,B
 2880 DATA30,930,100,68
 2890 DATA986,1279,100,68
 2900 DATA84,1162,98,160
 2910 DATA2,5,11,14,17,24,27,33,36
 2920 DATAZ,X,C,V,B,N,M,<,>,?
 2930 DATASft,Del,Cop
 2940 DATAS,D, ,G,H,J, ,L,+, ,},Rt
 2950 DEFPROCkey:*FX21
 2960 REPEAT UNTIL GET:CLS:ENDPROC
 2970 DEFPROCopenout:PROCmark(16,1)
 2980 PROCname:SP%=16-(LENT$)/2:*FX200,1
 2990 VDU28,0,25,39,22:CLS
 3000 X=OPENOUT T$:PRINT#X,q%
 3010 PRINTSPC(SP%)"Saving _ "T$
 3020 FORL%=0TOq%
 3030 PRINT#X,A%(L%),P%(L%),D%(L%)
 3040 NEXT:CLOSE#X:CLS:SP%=8-(LENT$)/2
 3050 CLS:PRINTSPC(SP%)T$" now saved. Pr
ess any key"
 3060 PROCkey:ENDPROC
 3070 DEFPROCopenin:PROCmark(18,1)
 3080 PROCname:SP%=16-(LENT$)/2
 3090 PRINTSPC(14)"PRESS SHIFT"
 3100 PRINTSPC(4)"(Cassette users press
play first)"
 3110 REPEATUNTILINKEY-1:q1%=q%:*FX200,1
 3120 VDU28,0,25,39,22:CLS
 3130 PRINTSPC(SP%)"Loading _ "T$
 3140 Y=OPENIN T$:INPUT#Y,q%
 3150 IFq%>KA%PROCwrongfile:ENDPROC
 3160 new%=1:FORL%=0TOq%
 3170 INPUT#Y,A%(L%),P%(L%),D%(L%)
 3180 NEXT:CLOSE#Y:CLS:SP%=14-(LENT$)/2
 3190 PRINTSPC(SP%)T$" now in memory"
 3200 VDU26:PROCmark(18,0):*FX200,0
 3210 PROCreplay:PROCmark(2,0)
 3220 VDU28,0,25,39,22:CLS
 3230 PRINTSPC(13)"Press any key"
 3240 PROCkey:ENDPROC
 3250 DEFPROCwrongfile:CLS:CLOSE#Y:VDU7
 3260 PRINT"Wrong type of file accessed
press a key"
 3270 PROCkey:q%=q1%:ENDPROC
 3280 DEFPROCerr:*FX12
 3290 REPORT:PRINT" at line ";ERL
 3300 *FX4,0
 3310 *FX21,0
 3320 *FX200,0
 3330 VDU14:ENDPROC
 3340 IF ERR=17GOTO180
 3350 IF O%=3 THEN *SPOOL
 3360 IF O%=4CLOSE#X
 3370 IF ERR=197OR ERR=199:GOTO 3400
 3380 IF ERR>188:PRINT:REPORT:GOTO 3400
 3390 MODE7:PROCerr:END
 3400 PRINT" .. Press any key"
 3410 PROCkey:GOTO 180
```

Get it right!

```
  10 =    0 0 |  580 = 18FE D | 1150 = 127C A | 1720 = 3E75 F | 2290 = 2734 0 | 2860 = F606 F
  20 =    0 0 |  590 = 69A5 D | 1160 = 8082 7 | 1730 = B719 0 | 2300 = 11ED E | 2870 = AA30 6
  30 =    0 0 |  600 = 8C9B 3 | 1170 = 4B05 A | 1740 = 4B60 6 | 2310 = A0CF F | 2880 = D2B4 6
  40 = 5922 2 |  610 = 69A5 C | 1180 = 7993 0 | 1750 =  7C4 4 | 2320 = 422E 4 | 2890 = 8301 C
  50 = 50EB 5 |  620 = 1530 6 | 1190 = 4B05 F | 1760 = 47A5 1 | 2330 = 8C8D 8 | 2900 = BE01 F
  60 = 4ACF 9 |  630 = 69A5 4 | 1200 = 13F5 C | 1770 = 4B80 2 | 2340 = AC4F F | 2910 = BCEF 5
  70 = E383 1 |  640 = 8C23 3 | 1210 = 8763 B | 1780 = 4F97 7 | 2350 = CEE4 B | 2920 = F144 5
  80 = 2FD3 1 |  650 = 69A5 1 | 1220 = 2DA3 3 | 1790 = CEAC 8 | 2360 = 5BA6 3 | 2930 = 915A 5
  90 = 9C6F 4 |  660 = 4990 1 | 1230 = F77D D | 1800 =  5A8 7 | 2370 = 9B1E F | 2940 = FF8D 8
 100 = 14F0 C |  670 = 69A5 4 | 1240 = DF41 0 | 1810 = CBF8 2 | 2380 = FE66 8 | 2950 = DCB3 1
 110 = 318C 3 |  680 = 7EFF 6 | 1250 = 5E1C 4 | 1820 = 33B1 7 | 2390 = ED0F 3 | 2960 = 3712 E
 120 = E750 8 |  690 = 69A5 3 | 1260 = 6E8E 3 | 1830 = DE78 E | 2400 = EF72 9 | 2970 = 7A3B 7
 130 = 41ED 3 |  700 = 5426 0 | 1270 = D9D1 1 | 1840 = ED0F F | 2410 = 6C92 8 | 2980 = DE2C C
 140 = F49D 5 |  710 = 69A5 2 | 1280 = A0C5 D | 1850 = 8784 8 | 2420 =  431 9 | 2990 = B36D A
 150 = A8B7 7 |  720 = CE0E 1 | 1290 = A74E 0 | 1860 = 672B F | 2430 = 7AF9 E | 3000 = 72E4 A
 160 = FD95 7 |  730 = 69A5 D | 1300 = 4684 9 | 1870 = 2B9A 4 | 2440 = 3C57 8 | 3010 = B757 1
 170 = 3203 2 |  740 = 7A2A 5 | 1310 = A01D 7 | 1880 = A34B A | 2450 = 5620 8 | 3020 = 584E D
 180 = B667 9 |  750 = 75A6 7 | 1320 = C9B5 1 | 1890 = 143A 2 | 2460 = EB16 0 | 3030 =  10D 6
 190 = 6E5C 1 |  760 = 796A 0 | 1330 = A74E 7 | 1900 = ED0F 5 | 2470 = B7F2 F | 3040 = 3BAB 1
 200 = 2541 0 |  770 = 4463 9 | 1340 = C32E 6 | 1910 = 5DBD 6 | 2480 = 1983 9 | 3050 = 26FD 9
 210 = 4E59 0 |  780 = 57EE 6 | 1350 = E319 D | 1920 = 6D73 7 | 2490 = C73B E | 3060 = 4B80 8
 220 = 7C35 F |  790 = 2B6D 4 | 1360 = 3ABC A | 1930 = 95D5 E | 2500 = 5A96 5 | 3070 = EFAA F
 230 = 812D 8 |  800 = 95F6 F | 1370 = FD70 2 | 1940 = D242 9 | 2510 = DBB9 E | 3080 = 15A5 5
 240 = A928 7 |  810 = C95F 9 | 1380 = 1E86 4 | 1950 = 7B75 B | 2520 = CF1C 8 | 3090 = 5142 7
 250 = 1003 5 |  820 = FF40 9 | 1390 = ED0F E | 1960 = 2FD3 6 | 2530 = A51A C | 3100 = 7EFE 3
 260 = 8363 5 |  830 = F367 F | 1400 = B38D 7 | 1970 = B36D 1 | 2540 = F7A3 C | 3110 = C6C0 9
 270 = 7474 E |  840 =  C4A 6 | 1410 = FE5C A | 1980 =  C16 C | 2550 = F1D8 5 | 3120 = B36D C
 280 = FD2E F |  850 = ED0F A | 1420 = AD51 A | 1990 = B4A9 3 | 2560 = 2FD1 4 | 3130 = 8C62 B
 290 = 5A41 6 |  860 = 4795 D | 1430 = F711 C | 2000 = 5BC8 1 | 2570 = 1642 E | 3140 = B92F 2
 300 = 74B2 B |  870 = 3FB3 E | 1440 = C7EC 3 | 2010 = 4F62 4 | 2580 = 4B88 A | 3150 = 6DE5 F
 310 = 69A5 E |  880 = 69F4 E | 1450 = 9D26 F | 2020 = 142C 8 | 2590 =  B74 D | 3160 = E84F 4
 320 = 949C 9 |  890 = 95B6 F | 1460 = F164 4 | 2030 = 4C6E 8 | 2600 = 6264 5 | 3170 = B3BC F
 330 = 69A5 9 |  900 = 9324 D | 1470 = F92A F | 2040 = DE15 C | 2610 = 2BC4 E | 3180 = 1962 2
 340 = 5D1F 8 |  910 = 26F0 6 | 1480 = 99F8 B | 2050 = 8D3E A | 2620 = 2EAD E | 3190 = F878 0
 350 = 69A5 F |  920 = D732 5 | 1490 = 2D3E D | 2060 = 10FA 8 | 2630 = 34AB 5 | 3200 = 5DB7 6
 360 = BCDE C |  930 = 71D9 3 | 1500 = 871F 0 | 2070 =  EFD A | 2640 = 7FCD 7 | 3210 =  114 F
 370 = 69A5 6 |  940 = A86F D | 1510 = ED0F 3 | 2080 = AE50 E | 2650 = B8F1 2 | 3220 = B36D C
 380 =  9AD E |  950 = 33B1 6 | 1520 = 57C6 6 | 2090 = A959 C | 2660 = 6ECC 9 | 3230 = DCBE A
 390 = 69A5 4 |  960 = D143 F | 1530 = 8396 0 | 2100 = 1469 3 | 2670 = CCB9 0 | 3240 = 4B80 3
 400 = D3EB F |  970 = 8345 B | 1540 = 80DB E | 2110 =   10 3 | 2680 = B2D4 D | 3250 = 5750 F
 410 = 69A5 E |  980 = 199E 8 | 1550 = 7564 5 | 2120 = 311A E | 2690 = 5E40 1 | 3260 = 3FD0 1
 420 = 10B3 9 |  990 =  7DF D | 1560 = E85C 9 | 2130 = 9017 C | 2700 = 835F 2 | 3270 = 73A5 4
 430 = 69A5 E | 1000 = D634 B | 1570 = B8F7 F | 2140 = 4B80 E | 2710 = DCAB 6 | 3280 = 7B77 8
 440 = 4AE3 9 | 1010 = 4A78 4 | 1580 = F3BB 7 | 2150 = 9719 C | 2720 = 2055 8 | 3290 = 6BDF 2
 450 = 69A5 1 | 1020 = 31AB D | 1590 = E174 8 | 2160 = E867 3 | 2730 = C6F8 5 | 3300 = F3A2 E
 460 =  453 C | 1030 = F80F 9 | 1600 = ED0F 0 | 2170 = AA3C F | 2740 = EEB6 3 | 3310 = 2B9A 0
 470 = 69A5 F | 1040 = 199E 9 | 1610 = CBC4 7 | 2180 = EE1F E | 2750 = C95C 3 | 3320 = 3FF2 5
 480 = C37E A | 1050 = 8E2B 4 | 1620 = 7FBA F | 2190 = 88E6 5 | 2760 = 377C 5 | 3330 = 1A9C 6
 490 = 69A5 4 | 1060 = F412 D | 1630 = ED0F 9 | 2200 = 9503 F | 2770 = DB0F 2 | 3340 = 6140 C
 500 = E8C9 4 | 1070 = 31AB 8 | 1640 = 4D81 E | 2210 = 65DF 0 | 2780 = EE6A 8 | 3350 = 888C 0
 510 = 69A5 3 | 1080 = 57FB C | 1650 =  90F 5 | 2220 =   9C A | 2790 = 7B88 9 | 3360 = 1499 D
 520 = 11E1 6 | 1090 = 1B02 E | 1660 = ED0F 9 | 2230 = 2C83 A | 2800 = D188 1 | 3370 = 201E 7
 530 = 69A5 5 | 1100 = A528 5 | 1670 = 337F 9 | 2240 = 468A 5 | 2810 = 4780 5 | 3380 = 2A19 5
 540 = 10C1 F | 1110 = D54A E | 1680 = 8E38 D | 2250 = 21A9 2 | 2820 = 56FE 2 | 3390 = 4659 7
 550 = 69A5 1 | 1120 = E531 6 | 1690 = 5957 7 | 2260 = F61A C | 2830 = 97B9 E | 3400 = CB57 2
 560 = AD1A A | 1130 = 2F2A A | 1700 = 7496 7 | 2270 = 7E9F E | 2840 = A74E 4 | 3410 = 4295 1
 570 = 69A5 A | 1140 = D0B4 7 | 1710 = 2911 6 | 2280 = A76D 5 | 2850 = 28E3 A |
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Dubious definitions

The light hearted saga of Bob and Trev continues – with a look at the real meaning of some technical terms

Dear Trev

Some of us were born to obscurity while others have greatness thrust upon them, as Andrea used to remark when she'd been on the bathroom scales. Incidentally (which doesn't mean between teeth) Andrea came back from her experiences with the Yeti looking a bit clapped out. Apparently he wasn't as abominable as is made out and in fact reminded her a little of Mike Cook.

But then everyone reminds her of Mike Cook. Many's the time I've heard her say "He's a dead ringer for Mike Cook". Still I didn't expect her to go ape over a Yeti.

"Aren't they called Big Feet in America?" I asked, to try to avoid her hints about ringing the changes.

"I don't know about the feet," she murmured, smiling like someone with a reduced instruction set.

Anyway I digress. Let's return to my call to glory. Everyone is supposed to be famous for ten minutes according to Andy what's-it-hole and my time came last week. It started with a phone call from the lads at Dottybase.

"Wally", they yelled, "we're just about to publish Pumping Silicon and we need a glossary".

"Go to a chemist", I said, shuddering at memories of adolescent days spent hanging around dark alleys trying to get up the nerve to do more than buy a bottle of Lickosade.

"We mean a sort of dictionary explaining technical terms to the man who knows nothing about micros. We thought you'd be ideal. Will you do it?"

"Course I will. How much do I get paid?" It was at that point that the line went dead. Undeterred I decided to enlist the help of the Romchester Rogues who were meeting that night to hold their annual speed programming championships. The idea is to type in a listing from The Micro User *without making any mistakes — which Clive says is the best example of a paradox he's ever come across.*

Last year's surprise winner had been Andrea (I always suspected she'd been practising with Mike Cook) and this year's was Clive. He'd been taking the whole thing very seriously and gone into training by reading old issues of The Micro User. *"I'd forgotten that it used to be about the Model B," he enthused. I suspect it was the sight of him in shorts that put the other contestants off, but he was the only one to type in the game's listing exactly as it appeared in the magazine. All the others got it working.*

My enjoyment of the evening was somewhat dampened by Andrea winging back in from Bustermandu and insisting on coming along. The problem was that I was supposed to be going with Doreen who'd managed to persuade Securicor to provide her with two more baby sitters for Robert and Marie — they'd been refusing to send any more until they got the last two back. So there I was with the pair of them, both pretending that they hadn't met and forcing me to introduce them.

"Ah, you're the kleptomaniac", simpered Doreen acidly.

"No, dear", seethed Andrea, shredding beer mats just by looking at them, "I'm a campanologist. I ring bells".

"Oh, sorry. I was sure Bob said you couldn't stop picking things up".

It was here knowing damn well for whom the bell was going to toll when we got home and desperate to change the subject that I brought up the glossary. Everyone came up with lots of definitions and in the hi-tech spirit of the club I wrote them down on the back of a redundant teletext adaptor. These are just a few of them:

***Electron**: Least said, soonest mended.*

***Archimedean screw**: Unprincipled use of an A3000.*

***Hacker:** Micro User journalist.*

***Goto:** A totally unnecessary and confusing construct vital for practical programming.*

***Programmer:** See masochist.*

***Masochist**: See Electron owner.*

***Machine code**: Language for show-offs.*

***Recursion**: See recursion.*

***6502**: Cost of a decent Archimedes set-up.*

They're the ones I can read. If I can decode the others I'll let you have them.

Cheers,

Bob

PS: Clive has been stripped of his 1989 speed programming title. Apparently they found traces of lickosade in his sample. Don't ask me how they could tell the difference.

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U.I.M. is disc only and will run on BBC B or B+ with sideways RAM and Master Series Computers. The full colour Archimedes version is due for release 6th December.

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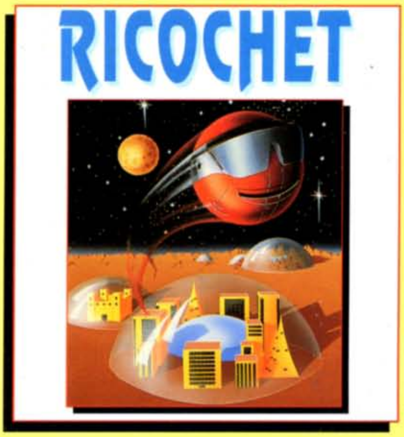

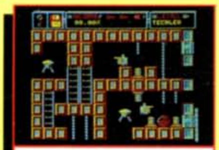

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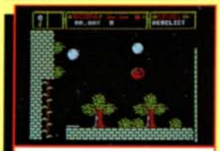

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RICOCHET has an amazing 330 different action-packed screens arranged over five levels. You get five games in one, since each level has its own distinctive theme, with superb graphics and unusual puzzles to solve.

You control SPRAT, the Small Partially Robotic Alien Time-traveller, in his quest to collect the five hour-glasses from the five worlds of RICOCHET. SPRAT can roll left and right, and can roll up and down ladders and ropes, but, his unique ability is that he can jump to different heights and in different directions. You have to control this fast-moving alien as he ricochets through the levels and solves the many clever puzzles.

You start in the FORTRESS world, with its alchemists and ghosts, and move on to TECHLEV with its high-tec graphics, and disc drives and tax demands. In DERELICT you explore a world that has fallen apart. THE UFO is a futuristic world with robots and ID machines. And finally to the ANCIENT world of Greece, to try and outwit Atlas and Hermes.

PLAY IT AGAIN SAM 11

A Superb New Four-Game Compilation

BARBARIAN

The brilliant No.1 hit game from Superior. A very realistic and exciting sword-fighting game, with one and two player options and keyboard or joystick control.

"Very enjoyable and sometimes frustrating"...Acorn User

BARON

A brand-new, mind-boggling arcade adventure from Superior, set in the Baron's forbidding castle. BARON has 113 action-packed screens with 49 different objects to collect and use. Shoot the Guards, but how do you get past the Bear, Mouse, Dog, Rabbit and Wolf ?

PIPELINE

The widely acclaimed arcade adventure from Superior, with a games designer included.

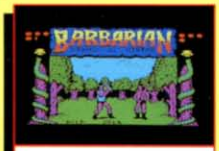
"PIPELINE is a masterpiece of brain-twisting entertainment. 10/10"...Micro User

"I recommend you rush out and buy it immediately"...Acorn User

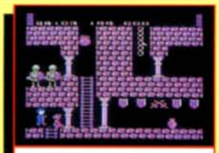
MONSTERS

The highly amusing, classic game from Acornsoft. Pursued by monsters along walls and up and down ladders, your only hope of survival is to outwit them by trapping them in holes you dig in their path.

"This game will drive you up the wall !
...Acorn User

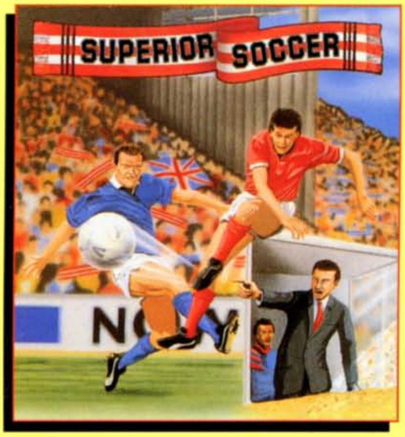


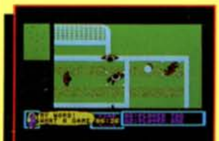
Barbarian



Baron

PLAY IT AGAIN SAM 11
BARBARIAN
PIPELINE
BARON
Monsters
MONSTERS





Right Wing Attack

PICK YOUR PLAYERS.

Team Selection

SUPERIOR SOCCER

Arcade Soccer & Football Management

You can choose to play either the action-packed arcade game or the challenging football management game, or, for the ultimate in football excitement and realism, you can play the combined arcade and management game. So you can choose to be a player, a manager or a player-manager!

ARCADE SOCCER FEATURES

- Heading, passing, dribbling, tackles, corners, throw-ins, goal kicks
- One and two player options - play against a friend or the computer
- Full pitch scanner and on-screen time and score information
- Control of playing time, game-skill and team colours

FOOTBALL MANAGEMENT FEATURES

- Four divisions with promotion and relegation
- Choose your team according to strengths and skills
- Transfers - sell players, and buy players if you have the cash
- Build up your finances and success by skill and clever strategy

BBC Micro Cassette.....£9.95 each **BBC Micro 5¼" Disc.....£11.95 each**

(Compatible with the BBC B, B+ and Master 128 computers.)

BBC Master Compact 3½" Disc.....£14.95 each **Electron Cassette.....£9.95 each**

(The screen pictures show the BBC Micro versions of the games.)

SUPERIOR SOFTWARE

ACORNSOFT

(Superior Software is a trading name of Superior Microcomputing Ltd.)
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